CANADA WIRE & CABLE

STANDARD CABLES UNDERGROUND

POWER CABLE

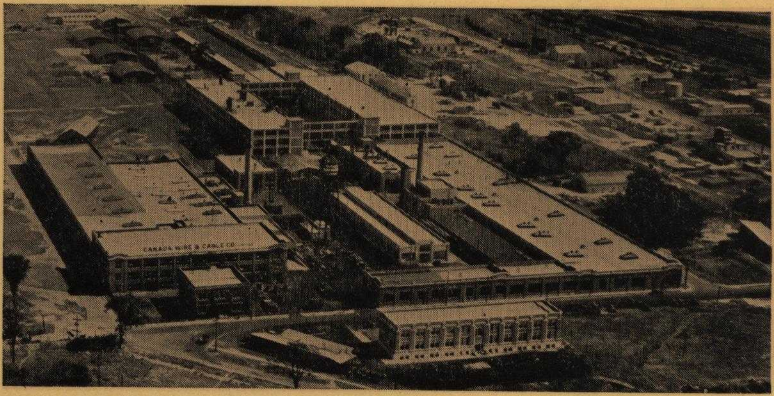
THIS IS THE PROPERTY OF

Mr. ....

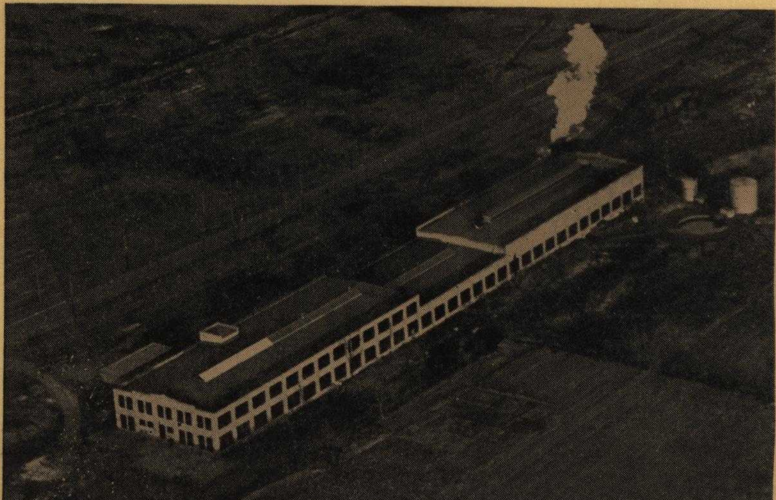
Company ....

....

....



Head Office and Factory, Leaside (Toronto), Ontario



Montreal East Factory

POWER CABLE

HANDBOOK No. P.C. 40

PAPER INSULATED "COMPOUND-FILLED" TYPE

PAPER INSULATED "OIL-FILLED" TYPE

VARNISHED CAMBRIC INSULATED

RUBBER INSULATED

CONTROL CABLES

NON-METALLIC SHEATHED

STEEL WIRE ARMOURED

DOUBLE STEEL TAPE ARMOURED

ASBESTOS-VARNISHED CAMBRIC INSULATED

RUBBER INSULATED PORTABLE POWER CABLES

CANADA WIRE AND CABLE COMPANY LIMITED

Standard Underground Cable Co. of Canada, Limited

FACTORIES: LEASIDE, ONT.; MONTREAL, QUE.

Cable Address: Canwirco, Toronto

DISTRICT SALES OFFICES AND WAREHOUSES:

**Montreal, Que., Ottawa, Ont., Toronto, Ont., Hamilton, Ont., Winnipeg, Man.
Regina, Sask., Calgary, Alta., Vancouver, B.C.**

INTRODUCTION

THIS catalogue has been compiled for the convenience of those specifying, purchasing, installing, or operating power cable, and contains data pertaining to all classes of cable up to and including high voltage Oil-Filled cable.

We believe that the information included in the tabulations, the descriptive and installation data, will be of particular value to the user, and that this catalogue is the most complete of its kind to date.

In its compilation, we have taken the fullest advantage of the guidance we have received from engineers representing most of the important users of power cable in this country, to whom we tender, herewith, our grateful acknowledgment.

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In using the special "India-tint" suede paper, we are taking advantage of the recent research carried out on behalf of the American Institute of Electrical Engineers, which adopted this type of paper as ensuring a minimum in eye-strain and maximum legibility.

PAPER INSULATED POWER CABLES

GENERAL

Paper insulated power cables have been in use since about 1890. The inherent suitability of this type of insulation for high voltage was such that a little more than a decade later three conductor cable was in operation at pressures as high as 25 kv. While operation at this voltage was entirely successful there was, for a long period of years, comparatively little demand for cable at ratings above 15 kv. because of practical limitations of generator voltage and the fact that the amounts of power required to be transmitted underground and the distances involved rarely justified the cost of transformation to higher voltages. Three conductor paper cable in the 15 kv. class was successfully produced on a large scale, and, while cable rated up to 25 kv. was practicable, development beyond the needs of the day did not proceed with rapidity.

In 1908 the first Sector Type conductor was developed, making it possible to produce multi-conductor cables of considerably larger conductor area without increasing the overall cable diameter.

The year 1920 may be thought of as marking the start of an advance which has enormously increased the voltage range of paper insulated power cables and has brought them to the present high standard of excellence.

It was in that year that General Cable Corporation, an associate of Canada Wire and Cable Co., produced cable for the first Type H installation in the world, an achievement culminating nearly seven years of intensive research and development. The success which crowned this pioneer work is evidenced by the fact that Type H Cable is now recognized as standard for multi-conductor cable operating above 15 kv.

Beginning in 1925, improvements in insulating paper resulted in manila paper, which had been generally used in this country, being rapidly replaced by wood pulp paper because of the greater uniformity and higher dielectric strength of the latter.

In 1926 the use of supercalendered paper was introduced because of its superior mechanical and electrical characteristics; and because it was possible by its use to grade the insulation so as to reduce its electrical stress near the conductor where it is highest.

Because of these properties, it is employed by Canada Wire & Cable Co. in all the extra high voltage insulated power cables.

EXTRA-HIGH VOLTAGE CABLES

Canada Wire & Cable Co. has manufactured all the 66 kv. cable in use in Canada, the first installation being the first of that voltage in the British Empire, and one of the pioneer installations in the world.

Always alert to maintain its leadership in the extra high voltage cable field, Canada Wire & Cable Co. by virtue of patent arrangements with Pirelli-General Cable Works Ltd., in Great Britain, and its close contact with General Cable Corporation, in the United States, is in a position to both manufacture and install Oil-Filled Cable Systems up to 230 kv. working pressure.

TYPES AND APPLICATIONS

The inherent properties of impregnated paper insulation include high electrical breakdown strength, and low dielectric loss. It is the only practical form of insulation for power cables of very high voltage. Moreover, because it is relatively inexpensive and can be operated with high conductor temperatures, it is the most economical insulation for an extensive range of applications in the low and intermediate voltage fields. Some of the principal types of impregnated paper insulated cables are briefly described in the following paragraphs.

COMPOUND-FILLED TYPE CABLES

Compound-filled type insulation is composed of layers of paper tapes applied helically over the conductor and impregnated with compounds principally consisting of mineral oil fractions sufficiently viscous to prevent "bleeding" when the cable is cut for splicing, and minimize "migration" in service.

Over the insulated and impregnated cables which may be single or multi-conductor, a tightly fitting lead sheath is extruded. Multi-conductor cables may be of the belted type wherein the conductors are insulated separately, cabled together with suitable filler material, and then covered with a layer of insulation or belt overall, after which they are impregnated and lead covered. Multi-conductor cables may also be Type H which consists of individually insulated conductors each covered with metallic shielding tape, cabled together with fillers, wrapped overall with metallic binder tape, then impregnated and lead covered.

Multi-conductor compound-filled belted cables have application at voltages up to 15 kv. The shielded, or Type H, multi-conductor compound-filled type cables are used for voltages up to 34.5 kv. Single conductor compound-filled cables are applicable to voltages as high as 69 kv. Compound-filled cables are used in underground ducts, and in aerial, submarine, or direct earth installations.

OIL-FILLED CABLES

(Pirelli Patents)

Oil-filled cables differ from compound-filled in several essential respects. An impregnating oil is used which is fluid at all operating temperatures and channels are provided for longitudinal oil flow. When the cable is heated by load and the oil expands, the oil flows lengthwise of the cable through the channel or channels into the joints and out into reservoirs. When the cable cools and the oil contracts, it is forced back into the cable by pressure on the reservoirs. Thus a positive pressure of moderate magnitude is kept on the oil at all times preventing the formation of voids in the insulation and permitting the use of greatly reduced insulation thicknesses.

Cable operating records covering the past several years indicate that a majority of service failures are attributable to damage to lead sheaths arising from a variety of causes. An important advantage of oil-filled cable is that service failures from these causes are practically eliminated because a positive and controlled internal oil pressure is main-

tained continuously within the sheath and, while some loss of oil will result in the event of sheath damage, the entrance of moisture is prevented and operation can continue until it is convenient to make repairs.

In single conductor oil-filled cables the oil channel is in the centre of the conductor. The conductor usually employed is composed of layers of strands laid concentrically over an open helical core wound from flat steel or copper strip and having an inside diameter which is sufficient to insure free flow of oil under all operating conditions. Radial oil flow takes place between the strands of the conductor and through the insulation.

Three conductor oil-filled cables are of the shielded, or Type H, design and have three oil channels formed by steel or copper springs, which lie in the spaces normally occupied by the filler material.

Single conductor oil-filled cable is in operation at voltages as high as 230 kv. Three conductor oil-filled cable is used for voltages up to 69 kv. being limited only by practical cable diameters. Oil-filled cables are installed in underground ducts, and are suitable also for aerial, submarine, or earth installation.

There is a wide range of voltages where both compound-filled and oil-filled cables find application. The choice for a particular installation depends on a number of factors and can best be made after a thorough engineering and economic study in which Canada Wire & Cable Co. engineers stand ready at all times to lend assistance.

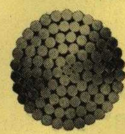
CONDUCTORS

Conductors for paper insulated power cables are normally composed of untinned, soft annealed copper wires having, before stranding, physical characteristics complying with the requirements of the Canadian Engineering Standards Association Draft Specification for Paper Insulated Lead Covered Cables.

Conductor sizes No. 8 B. & S. and larger normally are stranded.

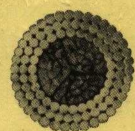
The following types of stranded conductors are used for paper insulated cables.

CONCENTRIC:



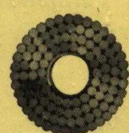
Regular concentric stranded cable is normally furnished for single conductor cables in all practicable sizes.

ANNULAR CONCENTRIC:



A concentric stranded conductor with a rope core, used in larger sizes of single conductor cables. For a given conductor area, the skin effect ratio is reduced, but at the expense of an increase in the overall diameter.

HOLLOW CORE:



A concentric stranded conductor built up over a core consisting of an open helical spring wound from flat steel or copper strip. It is used for single conductor oil-filled cable, the helical core providing the longitudinal channel for the flow of oil.

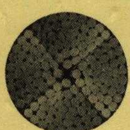
Conductors for oil-filled cables are available in two standard inside diameters, .500 and .690 inches, these being the inside diameters of the spring core.

SECTOR:

Similar to Concentric described above except that the conductor is formed into a 120° Sector shape for use in three conductor cables, 90° for four conductor cables, and 180° for two conductor cables.

Sector shaped conductors in multi-conductor cables result in a smaller overall diameter than the equivalent round conductor size, due to the reduction in interstice area, and in addition, our method of forming sector conductors imparts to multi-conductor cables the important advantage of unusually low alternating current resistance due to the practical elimination of proximity effect.

SEGMENTAL: TYPE "M"



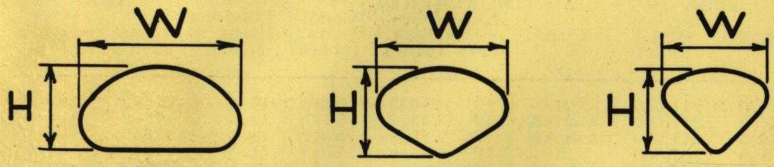
A stranded conductor composed of three or four segments lightly insulated from each other by means of paper tapes.

By the subdivision of the conductor into segments, transposition of the individual strands is accomplished in such a way as greatly to reduce skin effect.

This highly efficient method of reducing skin effect with very slight increase in diameter makes available much larger conductor sizes than were formerly practicable, particularly where the available duct diameter is limited.

The design is protected by Canadian Patent No. 367,692, issued to Mr. H. Milliken of Montreal, the inventor, in 1937.

DIMENSIONS OF SECTOR SHAPED CONDUCTORS



180° 120° 90°

Size B. & S. or C.M.	SECTOR DIMENSIONS—INCHES					
	180° (2 Conductor)		120° (3 Conductor)		90° (4 Conductor)	
	W	H	W	H	W	H
8	.219	.103	—	—	—	—
6	.276	.130	.250	.151	—	—
4	.348	.164	.315	.190	—	—
2	.438	.206	.398	.239	.364	.262
1	.492	.232	.447	.269	.405	.295
1/0	.553	.261	.502	.301	.455	.332
2/0	.622	.292	.564	.339	.512	.372
3/0	.697	.328	.632	.380	.574	.418
4/0	.783	.368	.712	.428	.645	.470
250,000	.850	.400	.772	.465	.700	.510
300,000	.930	.428	.846	.509	.767	.558
350,000	1.008	.473	.915	.550	.828	.604
400,000	1.075	.506	.976	.588	.883	.645
500,000	1.205	.567	1.092	.667	.993	.722
600,000	1.318	.620	1.198	.720	1.084	.790
750,000	1.474	.693	1.340	.806	1.215	.882
1,000,000	1.700	.800	1.544	.930	1.400	1.020

Note: The above dimensions are approximate only, and are subject to normal manufacturing tolerances.

BARE STRANDED COPPER—SIZE,

SIZE		A.S.T.M. STRANDINGS					CONDUCTOR AREA	
B. & S.	C.M.	Class	No. of Wires	Wire Diam. Inches	Cond. Diam. Inches	Cond. Diam. Mm.	Square Inches	Square Mm.
4/0	211,600	B	19	.1055	.528	13.4	.1662	107
4/0	211,600	A & AA	12	.1328	.552	14.0	.1662	107
4/0	211,600	A & AA	7	.1739	.522	13.3	.1662	107
3/0	167,800	B	19	.0940	.470	11.9	.1318	85.0
3/0	167,800	A & AA	12	.1183	.492	12.5	.1318	85.0
3/0	167,800	A & AA	7	.1548	.464	11.8	.1318	85.0
2/0	133,100	B	19	.0837	.419	10.6	.1045	67.4
2/0	133,100	—	12	.1053	.437	11.1	.1045	67.4
2/0	133,100	A & AA	7	.1379	.414	10.5	.1045	67.4
1/0	105,500	B	19	.0745	.373	9.46	.08286	53.5
1/0	105,500	—	12	.0938	.390	9.90	.08286	53.5
1/0	105,500	A & AA	7	.1228	.368	9.34	.08286	53.5
1	83,690	B	19	.0664	.332	8.43	.06573	42.4
1	83,690	A	7	.1093	.328	8.33	.06573	42.4
1	83,690	AA	3	.1670	.360	9.14	.06573	42.4
2	66,370	B & A	7	.0974	.292	7.42	.05213	33.6
2	66,370	AA	3	.1487	.320	8.14	.05213	33.6
3	52,630	B & A	7	.0867	.260	6.61	.04134	26.7
3	52,630	AA	3	.1325	.285	7.24	.04134	26.7
4	41,740	B & A	7	.0772	.232	5.88	.03278	21.2
4	41,740	AA	3	.1180	.254	6.46	.03278	21.2
5	33,100	B	7	.0688	.206	5.24	.02600	16.8
6	26,250	B	7	.0612	.184	4.67	.02062	13.3
7	20,820	B	7	.0545	.164	4.16	.01635	10.5
8	16,510	B	7	.0486	.146	3.70	.01297	8.37
9	13,090	B	7	.0432	.130	3.30	.01028	6.63
10	10,380	B	7	.0385	.116	2.95	.008152	5.26
12	6,530	B	7	.0305	.0915	2.33	.005129	3.32
14	4,107	B	7	.0242	.0726	1.84	.003226	2.08

WEIGHT, RESISTANCE AND BREAKING STRENGTH

Size B. & S.	WEIGHT Pounds per 1,000′	WEIGHT Kg. per Km.	* AVERAGE RESISTANCE OHMS/1,000′ @ 25°C.	‡ BREAKING STRENGTH POUNDS Hard-Drawn	‡ BREAKING STRENGTH POUNDS Medium Hard-Drawn	‡ BREAKING STRENGTH POUNDS Annealed
4/0	653.3	972	.0509	9,617	7,479	6,149
4/0	653.3	972	.0509	9,483	7,378	6,149
4/0	653.3	972	.0509	9,154	7,269	6,149
3/0	518.1	771	.0642	7,698	5,970	5,074
3/0	518.1	771	.0642	7,556	5,890	4,876
3/0	518.1	771	.0642	7,366	5,812	4,876
2/0	410.9	611	.0811	6,153	4,766	4,025
2/0	410.9	611	.0811	6,049	4,704	3,868
2/0	410.9	611	.0811	5,927	4,641	3,868
1/0	325.7	485	.102	4,899	3,803	3,190
1/0	325.7	485	.102	4,840	3,753	3,190
1/0	325.7	485	.102	4,750	3,703	3,066
1	258.4	385	.129	3,898	3,037	2,531
1	258.4	385	.129	3,804	2,958	2,432
1	255.9	380	.129	3,620	2,875	2,432
2	204.9	305	.162	3,045	2,361	2,007
2	202.9	302	.162	2,913	2,299	1,929
3	162.5	242	.205	2,433	1,885	1,591
3	160.9	239	.205	2,359	1,835	1,529
4	128.9	192	.259	1,938	1,505	1,262
4	127.6	190	.259	1,879	1,465	1,213
5	102.2	152	.326	1,542	1,201	1,001
6	81.05	121	.410	1,228	958.6	793.7
7	64.28	95.7	.519	977.2	765.3	629.6
8	50.98	75.9	.654	777.2	610.7	499.2
9	40.42	60.0	.824	618.1	487.3	395.8
10	32.05	47.6	1.03	491.6	388.9	313.9
12	20.16	30.0	1.65	311.1	247.7	197.5
14	12.68	18.8	2.63	197.1	157.7	124.2

* Resistances are based on the International Annealed Copper Standard, viz., 0.15328 ohm (meter gram) at 20°C. Weights and resistances have 2% added to allow for stranding. Hard-drawn copper may be taken as about 2.7% higher resistivity than annealed copper.

‡ Breaking strengths are based on A.S.T.M. specification requirements, using minimum values for hard and medium hard-drawn wire, and maximum values for soft wire.

BARE STRANDED COPPER—SIZE,

SIZE C.M.	A.S.T.M. STRANDINGS Class	No. of Wires	Wire Diam. Inches	Cond. Diam. Inches	Cond. Diam. Mm.	CONDUCTOR AREA Square Inches	Square Mm.
5,000,000	B	217	.1518	2.581	65.6	3.927	2,530
5,000,000	A	169	.1720	2.580	65.6	3.927	2,530
4,500,000	B	217	.1440	2.448	62.2	3.534	2,280
4,500,000	A	169	.1632	2.448	62.2	3.534	2,280
4,000,000	B	217	.1358	2.309	58.6	3.142	2,027
4,000,000	A	169	.1538	2.307	58.6	3.142	2,027
3,500,000	B	169	.1439	2.159	54.8	2.749	1,772
3,500,000	A	127	.1660	2.158	54.8	2.749	1,772
3,000,000	B	169	.1332	1.998	50.8	2.356	1,518
3,000,000	A	127	.1537	1.998	50.8	2.356	1,518
2,500,000	B	127	.1403	1.824	46.3	1.964	1,266
2,500,000	A	91	.1657	1.823	46.3	1.964	1,266
2,000,000	B	127	.1255	1.632	41.4	1.571	1,013
2,000,000	A	91	.1482	1.630	41.4	1.571	1,013
1,750,000	B	127	.1174	1.526	38.8	1.374	886
1,750,000	A	91	.1387	1.526	38.8	1.374	886
1,500,000	B	91	.1284	1.412	35.9	1.178	760
1,500,000	A	61	.1568	1.411	35.8	1.178	760
1,250,000	B	91	.1172	1.289	32.7	0.9817	633
1,250,000	A	61	.1431	1.288	32.7	.9817	633
1,000,000	B & A	61	.1280	1.152	29.3	.7854	507
1,000,000	AA	37	.1644	1.151	29.2	.7854	507
900,000	B & A	61	.1215	1.094	27.8	.7069	456
900,000	AA	37	.1560	1.092	27.7	.7069	456
800,000	B & A	61	.1145	1.031	26.2	.6283	405
800,000	AA	37	.1470	1.029	26.1	.6283	405
750,000	B & A	61	.1109	0.998	25.3	.5890	380
750,000	AA	37	.1424	.997	25.3	.5890	380
700,000	B & A	61	.1071	.964	24.5	.5498	355
700,000	AA	37	.1375	.963	24.5	.5498	355
600,000	B	61	.0992	.893	22.7	.4712	304
600,000	A & AA	37	.1273	.891	22.6	.4712	304
500,000	B & A	37	.1162	.813	20.6	.3927	253
500,000	AA	19	.1622	.811	20.6	.3927	253
450,000	B & A	37	.1103	.772	19.6	.3534	228
450,000	AA	19	.1539	.770	19.6	.3534	228
400,000	B	37	.1040	.728	18.5	.3142	203
400,000	A & AA	19	.1451	.726	18.4	.3142	203
350,000	B	37	.0973	.681	17.3	.2749	177
350,000	A	19	.1357	.679	17.2	.2749	177
350,000	AA	12	.1708	.710	18.0	.2749	177
300,000	B	37	.0900	.630	16.0	.2356	152
300,000	A	19	.1257	.629	16.0	.2356	152
300,000	AA	12	.1581	.657	16.7	.2356	152
250,000	B	37	.0822	.575	14.6	.1964	127
250,000	A	19	.1147	.574	14.6	.1964	127
250,000	AA	12	.1443	.600	15.2	.1964	127

WEIGHT, RESISTANCE AND BREAKING STRENGTH

SIZE C.M.	WEIGHT Pounds per 1,000′	Kg. per Km.	*AVERAGE RESISTANCE OHMS/1,000′ @ 25°C.	‡BREAKING STRENGTH POUNDS Hard-Drawn	Medium Hard-Drawn	Annealed
5,000,000	15,890	23,620	.00216	219,500	173,200	145,300
5,000,000	15,890	23,620	.00216	216,300	171,800	145,300
4,500,000	14,300	21,280	.00240	200,400	156,900	130,800
4,500,000	14,300	21,280	.00240	197,200	154,600	130,800
4,000,000	12,590	18,720	.00270	178,100	139,500	116,200
4,000,000	12,590	18,720	.00270	175,600	138,500	116,200
3,500,000	11,020	16,400	.00308	155,900	122,000	101,700
3,500,000	11,020	16,400	.00308	153,400	120,200	101,700
3,000,000	9,353	13,900	.00359	134,400	104,600	87,180
3,000,000	9,353	13,900	.00359	131,700	103,900	87,180
2,500,000	7,794	11,590	.00432	111,300	87,170	72,650
2,500,000	7,794	11,590	.00432	109,600	85,880	72,650
2,000,000	6,175	9,190	.00539	90,050	70,210	58,120
2,000,000	6,175	9,190	.00539	87,790	69,270	58,120
1,750,000	5,403	8,050	.00617	78,800	61,430	50,850
1,750,000	5,403	8,050	.00617	77,930	61,020	50,850
1,500,000	4,631	6,890	.00719	67,540	52,650	43,590
1,500,000	4,631	6,890	.00719	65,840	51,950	43,590
1,250,000	3,859	5,740	.00863	56,280	43,880	36,320
1,250,000	3,859	5,740	.00863	55,670	43,590	36,320
1,000,000	3,088	4,590	.0108	45,030	35,100	29,060
1,000,000	3,088	4,590	.0108	43,830	34,350	29,060
900,000	2,779	4,140	.0120	40,520	31,590	26,150
900,000	2,779	4,140	.0120	39,510	31,170	26,150
800,000	2,470	3,680	.0135	36,360	28,270	23,250
800,000	2,470	3,680	.0135	35,120	27,710	23,250
750,000	2,316	3,450	.0144	34,090	26,510	21,790
750,000	2,316	3,450	.0144	33,400	26,150	21,790
700,000	2,161	3,220	.0154	31,820	24,740	20,340
700,000	2,161	3,220	.0154	31,170	24,410	20,340
600,000	1,853	2,760	.0180	27,530	21,350	18,140
600,000	1,853	2,760	.0180	27,020	21,060	17,440
500,000	1,544	2,300	.0216	22,510	17,550	14,530
500,000	1,544	2,300	.0216	21,950	17,320	14,530
450,000	1,389	2,070	.0240	20,450	15,900	13,080
450,000	1,389	2,070	.0240	19,750	15,590	13,080
400,000	1,235	1,840	.0270	18,320	14,140	11,620
400,000	1,235	1,840	.0270	17,560	13,850	11,620
350,000	1,081	1,610	.0308	16,060	12,450	10,580
350,000	1,081	1,610	.0308	15,590	12,200	10,170
350,000	1,081	1,610	.0308	15,140	12,020	10,170
300,000	926.3	1,380	.0360	13,870	10,740	9,071
300,000	926.3	1,380	.0360	13,510	10,530	8,718
300,000	926.3	1,380	.0360	13,170	10,390	8,718
250,000	771.9	1,150	.0431	11,560	8,952	7,559
250,000	771.9	1,150	.0431	11,360	8,836	7,265
250,000	771.9	1,150	.0431	11,130	8,717	7,265

* Resistances are based on the International Annealed Copper Standard, viz., 0.15328 ohm (meter gram) at 20°C. Weights and resistances are increased as follows to allow for stranding: 5,000,000 and 4,500,000 C.M., 5%; 4,000,000 and 3,500,000 C.M., 4%; 3,000,000 and 2,500,000 C.M., 3%; other sizes 2%. Hard-drawn copper may be taken as about 2.7% higher resistivity than annealed copper.

‡ Breaking strengths are based on A.S.T.M. specification requirements, using minimum values for hard and medium hard-drawn wire, and maximum values for soft wire.

BARE SOLID COPPER WIRE TABLE—SIZE,

Size	DIAMETER		AREA		
B. & S.	Inches	Mm.	C.M.	Square Inches	Square Mm.
4/0	.4600	11.7	211,600	.1662	107.0
3/0	.4096	10.4	167,800	.1318	85.0
2/0	.3648	9.3	133,100	.1045	67.4
1/0	.3249	8.3	105,500	.08289	53.5
1	.2893	7.3	83,690	.06573	42.4
2	.2576	6.5	66,370	.05213	33.6
3	.2294	5.8	52,630	.04134	26.7
4	.2043	5.2	41,740	.03278	21.2
5	.1819	4.6	33,100	.02600	16.8
6	.1620	4.1	26,250	.02062	13.3
7	.1443	3.7	20,820	.01635	10.5
8	.1285	3.3	16,510	.01297	8.37
9	.1144	2.91	13,090	.01028	6.63
10	.1019	2.59	10,380	.008155	5.26
11	.09074	2.30	8,234	.006467	4.17
12	.08081	2.05	6,530	.005129	3.31
13	.07196	1.83	5,178	.004067	2.62
14	.06408	1.63	4,107	.003225	2.08
15	.05707	1.45	3,257	.002558	1.65
16	.05082	1.29	2,583	.002028	1.31
17	.04526	1.15	2,048	.001609	1.04
18	.04030	1.02	1,624	.001276	0.823
19	.03589	0.91	1,288	.001012	.653
20	.03196	.81	1,022	.0008023	.518
21	.02846	.72	810.1	.0006363	.411
22	.02535	.64	642.5	.0005046	.326
23	.02257	.57	509.5	.0004001	.258
24	.02010	.51	404.0	.0003173	.205
25	.01790	.45	320.4	.0002517	.162
26	.01594	.40	254.1	.0001996	.129
27	.01420	.36	201.5	.0001583	.102
28	.01264	.32	159.8	.0001255	.0810
29	.01126	.29	126.7	.00009954	.0642
30	.01003	.25	100.5	.00007894	.0509
31	.008928	.227	79.70	.00006260	.0404
32	.007950	.202	63.21	.00004964	.0320
33	.007080	.180	50.13	.00003937	.0254
34	.006305	.160	39.75	.00003122	.0201
35	.005615	.143	31.52	.00002476	.0160
36	.005000	.127	25.00	.00001963	.0127
37	.004453	.113	19.83	.00001557	.0100
38	.003965	.101	15.72	.00001235	.0080
39	.003531	.090	12.47	.000009793	.0063
40	.003145	.080	9.888	.000007766	.0050
41	.002800	.072	7.842	.000006159	.0039
42	.002494	.063	6.219	.000004884	.0032
43	.002221	.057	4.932	.000003873	.0025
44	.001978	.050	3.911	.000003072	.0020

WEIGHT, RESISTANCE AND BREAKING STRENGTH

Size B. & S.	WEIGHT Pounds per 1,000′	WEIGHT Kg. per Km.	*AVERAGE RESISTANCE OHMS/1,000′ @ 25°C.	‡ BREAKING STRENGTH POUNDS Hard-Drawn	Medium Hard-Drawn	Soft or Annealed
4/0	641	953	.0500	8,143	6,980	5,983
3/0	508	756	.0630	6,722	5,667	4,745
2/0	403	599	.0795	5,519	4,599	3,763
1/0	319	475	.100	4,517	3,730	2,984
1	253	377	.126	3,688	3,024	2,432
2	201	299	.159	3,003	2,450	1,929
3	159	237	.201	2,439	1,984	1,530
4	126	188	.253	1,970	1,584	1,213
5	100	149	.320	1,591	1,264	961.9
6	79.5	118	.403	1,280	1,010	762.9
7	63.0	93.7	.508	1,030	806.6	605.0
8	50.0	74.4	.641	826.0	643.9	479.8
9	39.6	58.9	.808	661.2	514.2	380.5
10	31.4	46.8	1.02	529.2	410.4	314.0
11	24.9	37.1	1.28	422.9	327.6	249.0
12	19.8	29.4	1.62	337.0	261.6	197.5
13	15.7	23.3	2.04	268.0	208.8	156.6
14	12.4	18.5	2.58	213.5	166.6	124.2
15	9.86	14.7	3.25	169.8	133.0	98.48
16	7.82	11.6	4.09	135.1	106.2	78.10
17	6.20	9.23	5.16	107.5	84.71	61.93
18	4.92	7.32	6.51	85.47	67.61	49.12
19	3.90	5.80	8.21	67.99	53.95	38.95
20	3.09	4.60	10.4	54.08	43.05	30.89
21	2.45	3.65	13.1	43.07	34.36	24.50
22	1.94	2.89	16.5	34.26	27.41	19.43
23	1.54	2.30	20.8	27.25	21.87	15.41
24	1.22	1.82	26.2	21.67	17.45	12.69
25	0.970	1.44	33.0	17.26	13.92	10.07
26	.769	1.14	41.6	13.73	11.11	7.983
27	.610	0.908	52.5	10.92	8.863	6.331
28	.484	.720	66.2	8.698	7.070	5.021
29	.384	.571	83.4	6.918	5.640	3.981
30	.304	.453	105.0	5.502	4.499	3.157
31	.241	.359	133	4.376	3.589	2.504
32	.191	.285	167	3.485	2.862	1.986
33	.152	.226	211	2.772	2.283	1.575
34	.120	.179	266	2.204	1.821	1.249
35	.0954	.142	335	1.755	1.452	0.9904
36	.0757	.113	423	1.396	1.158	.7854
37	.0600	.0893	533	1.110	0.9238	.6228
38	.0476	.0708	673	0.8829	.7367	.4939
39	.0377	.0562	848	.7031	.5876	.3917
40	.0299	.0445	1,070	.5592	.4685	.3106
41	.0237	.0353	1,350	.4434	.3716	.2464
42	.0188	.0280	1,700	.3517	.2947	.1954
43	.0149	.0222	2,140	.2789	.2337	.1549
44	.0118	.0176	2,700	.2212	.1853	.1229

* Resistances are based on the International Annealed Copper Standard, viz., 0.15328 ohm (meter gram) at 20°C. Hard-drawn copper may be taken as about 2.7% higher resistivity than annealed copper.

‡ Breaking strengths are based on A.S.T.M. specification requirements, using minimum values for hard and medium hard-drawn wire, and maximum values for soft wire.

INSULATION

PAPER:

In the manufacture of paper insulated power cables, Canada Wire & Cable Co. uses the highest quality of paper made from wood pulp.

Three grades of paper are used depending upon the rated voltage of the cable.

In extra high voltage cables, all three grades of paper are used as follows:

(a) Super-dense
(b) High density
(c) Normal density

In building up the paper insulation over the conductors, super-dense is applied nearest to the conductor where the voltage gradient is steepest. Next, the high density paper, and finally the normal density paper tapes are applied. This procedure constitutes the so-called grading of insulation which reduces the maximum stress near the conductor and results in a more nearly uniform radial stress distribution through the insulation wall.

It is well known that the more dense the paper, that is, the more closely the pure cellulose fibres are packed together, the greater the barrier action to the passage of ions. This explains why cables made with super-dense paper have somewhat higher dielectric strength at 60 cycles and 15% to 25% higher impulse strength than those made with normal or low density paper. The higher impulse, or surge strength is particularly important in oil-filled cables where the insulation walls are reduced.

With very dense paper the ratio of impregnating compound to paper becomes less. As the co-efficient of expansion of compound is large compared with that of paper, the reduced quantity of compound accompanying the use of super-dense paper results in less expansion of the cable sheath with temperature increase, thereby reducing the

tendency to form ionizable voids when decreasing temperature causes contraction.

The pure cellulose fibres in insulating paper are responsible for its mechanical strength. The greater number of fibres per unit of volume in super-dense paper gives it a tensile strength 30% in excess of that of normal density paper.

IMPREGNATING OILS

COMPOUND-FILLED CABLES

Petroleum derivatives rigidly selected for this purpose are standard for the basic ingredient for compound-filled paper insulated power cables.

This type of compound minimizes the formation of voids in the insulation. The impregnant is purposely fairly viscous to minimize "bleeding" from the insulation. The derivatives used are specially refined products from which tarry residues, unsaturated hydrocarbons, and volatile constituents have been removed. Not only must the correct crudes be used in the preparation of suitable cable compounds, but correct and adequate refining methods must be employed. Over-refinement cannot be permitted as heat-aging tests on the oil and accelerated life tests on cable samples show this to result in instability of the insulation in service.

Special compounds having high viscosity are available for vertical risers, and other applications where migration is likely to be a problem.

OIL-FILLED CABLES

Oil-filled cable is impregnated with a refined mineral oil of a viscosity comparable to, but somewhat greater than, that of standard transformer oil. The properties best adapted to give successful service in oil-filled cables have been carefully determined and the oil is selected to meet these requirements. One of the essentials is a suitable viscosity-temperature relationship so that the impregnant will be sufficiently fluid at all operating temperatures to assure free

flow to all points of the cable, thus preventing the formation of voids. The oils are of a high purity, and have high dielectric strength and low dielectric loss throughout the temperature range of operation. Stability under high electrical stress is another and especially important property of the oil used. After complete tests are made on the oil as received, careful control tests are continued on the oil both before it is used in the cable and on samples taken from the cable after manufacture.

SHIELDING

Over the paper insulation of the individual conductors of Type "H" multi-conductor cable, Canada Wire & Cable Co. employs a special form of copper shielding tape to act both as a shielding tape and as an efficient conductor of heat away from the centre of the cable.

Over the paper insulation of single conductor Type "H" cables, Canada Wire & Cable Co. employs a metallized paper tape which remains throughout the life of the cable in intimate contact with the surface of the paper insulation and prevents any voids between the insulation and the lead sheath from being subjected to electric stress.

METAL BINDER TAPE

On Type "H" (shielded) multi-conductor cables, a metal reinforcing or binder tape is applied over the assembled cabled conductors. This tape serves to bind the conductors together during subsequent manufacturing operations. It also relieves mechanical stress on the lead sheath caused by power system short circuits. As contrasted with a binder tape of non-metallic material, it serves as a path of high thermal conductivity between the individual conductor shields and the heat-dissipating lead sheath. The metal used for the binder tape may be either magnetic (steel) or non-magnetic (bronze), although the latter is furnished unless otherwise specified. As far as those additional losses from skin effect, proximity effect, losses in the binder tape itself, or in the lead sheath are concerned, it has been found that

there is very little difference between cables with magnetic binders and those having non-magnetic tapes. The magnetic binder does, however, increase the cable reactance, but this increase is inherently so little that it is of no great importance except in cases of parallel operation. The following recommendations are made as guides in selecting the proper binder tape material:

NEW INSTALLATIONS:

Bronze binder tapes provide adequate reinforcement and their use is recommended for all new installations.

INSTALLATION EXTENSIONS:

In general, where a new cable is to be installed in parallel with an existing cable having the same conductor size, it is recommended that the binder tape be of the same type as in the existing cable so that impedances may be more nearly equal. Where the parallel cables are of different conductor sizes or construction, the question of load division must be studied and the binder tape selected for the new cable which will give the most favourable relative loadings.

SHEATHS

The usual sheath material for impregnated paper insulated power cables is lead, usually in pure, but occasionally in alloy form.

The extensive use of lead and the variety of the lead alloys employed warrant brief mention of the more important ones, together with their general properties and applications.

COMMON LEAD:

Common lead supplied by Canada Wire & Cable Co. has a purity of 99.85% in accordance with A.S.T.M. Specification for Grade III. It is the most satisfactory and economical form of paper cable sheath for the great majority of installations. It is highly resistant to corrosion under most conditions and long experience evidences its permanence, stability, and general suitability for cable sheathing.

ANTIMONY LEAD:

Alloys containing ¾ to 1% of antimony are harder than common lead and have high fatigue strength. They are extensively used for aerial cable where vibration and wear resistance are required.

TIN LEAD:

Alloys of 2% or 3% tin have tensile strength, fatigue strength, and hardness comparable to the antimony alloys, and are suitable where abrasion or vibration resistance must be provided. The 2% tin alloy was formerly considered standard for oil-filled cables, but has been superseded by High Copper lead except for situations where rough ducts necessitate a lead of high abrasion resistance.

HIGH COPPER LEAD:

High Copper Lead is a controlled alloy having the following specification. Its most important property is its resistance to creep, having in this respect considerable advantage over the 2% tin alloy heretofore used for oil-filled cable.

Silver	.002% max.
Copper	.04% to .08%
Arsenic, Antimony, and Tin	.002% max.
Zinc	.001% max.
Iron	.0015% max.
Bismuth	.005% to .05%
Lead (by difference)	99.90% min.

LEAD SHEATH THICKNESSES

FOR PAPER INSULATED CABLES

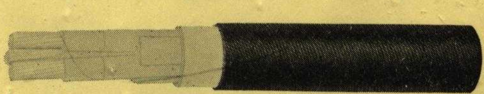
Core Diameter, Inches	Compound-Filled Cables, Normal: Mils	Compound-Filled Cables, Normal: 1/64 Ins.	Compound-Filled Cables, Submarine: Mils	Compound-Filled Cables, Submarine: 1/64 In.	Oil-Filled: Mils	Oil-Filled: 1/64 In.
0 — .600	80	5	95	6	—	—
.601— .900	85	5½	100	6½	—	—
.901—1.200	95	6	110	7	110	7
1.201—1.500	100	6½	115	7½	110	7
1.501—1.800	110	7	125	8	115	7½
1.801—2.100	115	7½	130	8½	125	8
2.101—2.400	125	8	140	9	135	8½
2.401—2.700	135	8½	150	9½	140	9
2.701—3.000	140	9	160	10	150	9½
3.001—3.300	155	10	170	11	155	10
3.301—3.600	165	10½	180	11½	170	11
3.601 and over	170	11	185	12	170	11

The ruling dimensions are those expressed in mils.

PROTECTIVE COVERINGS

Where lead covered impregnated paper insulated power cables are to be subjected to severe mechanical or chemical influences, some form of protective covering over the lead sheath is recommended. Some of the more frequently used coverings are described here, together with notes as to their general application.

JUTE COVERING

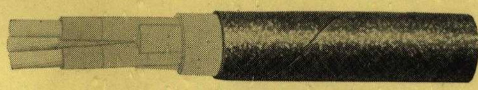


Where a moderate amount of mechanical and corrosion protection is required this may be secured by the use of one or two servings of jute yarn over the lead sheath. The lead covered cable is run through hot asphalt compound and served with a closely wound layer of impregnated jute yarn. If two wraps are specified they are applied with opposite directions of lay. Compound is applied between layers and overall, with a final coating of non-adhesive compound to prevent successive layers of cable on the shipping reel from sticking and for convenience in handling.

Minimum thicknesses of jute servings are given in the following table:

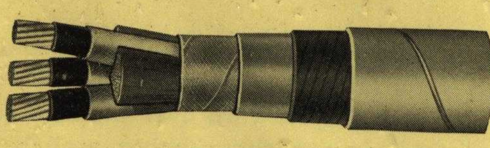
Diameter over Lead Sheath Inches	Minimum Thickness of Jute Serving One Serving Inches	Two Servings Inches
0—1.000	4/64	6/64
1.001—2.500	4/64	7/64
2.501 and larger	4/64	8/64

DUCK TAPE



As an alternate covering, duck tape, pre-saturated with asphalt compound, having a thickness of not less than 20 mils is applied to the lead sheath with a lap of not less than 25%. The lead sheath is run through hot asphalt compound immediately before application of the tape. If more than one tape is specified, a coating of compound is applied over each tape except the outer one.

DOUBLE STEEL TAPE ARMOUR



Galvanized Double Steel Tape Armoured Cable.

The lead sheath applied over the insulated conductors in lead sheathed cables, is intended primarily to prevent the entrance of moisture, oil, etc., and to a limited extent to provide protection from mechanical injury. However, in all cases where a cable is installed in a location where it is

definitely exposed to mechanical damage either during, or after installation, it is recommended that the lead sheath itself be permanently protected by a double layer of steel tape armouring, applied in the factory.

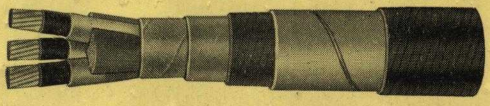
In applying this steel tape armouring, a layer of impregnated jute is helically wound over the lead sheath, over which is placed two layers of flat steel tape, also helically wound.

Where the cable is to be installed entirely above ground, galvanized steel tapes are used with no further covering, but for cables to be buried directly in the ground, ungalvanized steel tapes are applied, and a helically wound layer of impregnated jute is wound overall.

The galvanized steel tape armoured cable is particularly suitable for the larger power feeders inside factory buildings or basements, where it is usually suspended along the walls, ceilings, roof trusses, etc., throughout its entire length.

Its comparative flexibility permits easy and inconspicuous installation in buildings where structural features are such that rigid conduit construction would be extremely difficult, and much more costly.

Branch taps into an installed cable are easily made by cutting the cable through, and inserting a standard box over the two ends.



Jute Covered Double Steel Tape Armoured Cable

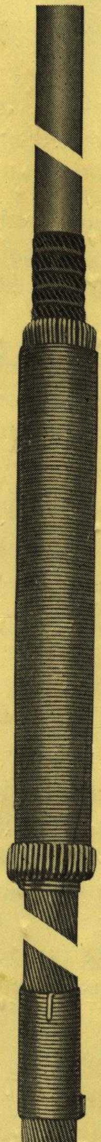
Table 1. Giving the addition to be made to the overall diameters of plain lead sheathed cables to allow for amouring.

Overall Diameter of Lead Sheath	Addition to Overall Diameter for Armouring	
	No Jute Overall	Jute Overall
0.000″ to 1.000″	0.19″	0.340″
1.001″ and larger	0.22″	0.380″

Table II. Giving the addition to be made to the weight of plain lead sheathed cables to allow for armouring.

Diam. Over Lead, Inches	Additional Weight per 1,000 Ft. for Armouring, Pounds	Diam. Over Lead, Inches	Additional Weight per 1,000 Ft. for Armouring, Pounds
.25	170	2.05	1,670
.30	200	2.10	1,700
.35	240	2.15	1,750
.40	270	2.20	1,790
.45	300	2.25	1,830
.50	340	2.30	1,860
.55	380	2.35	1,900
.60	410	2.40	1,940
.65	440	2.45	1,980
.70	480	2.50	2,010
.75	520	2.55	2,050
.80	560	2.60	2,080
.85	590	2.65	2,130
.90	620	2.70	2,160
.95	660	2.75	2,200
1.00	690	2.80	2,240
1.05	920	2.85	2,280
1.10	960	2.90	2,310
1.15	1,000	2.95	2,350
1.20	1,040	3.00	2,390
1.25	1,070	3.05	2,420
1.30	1,110	3.10	2,460
1.35	1,150	3.15	2,500
1.40	1,190	3.20	2,540
1.45	1,220	3.25	2,570
1.50	1,260	3.30	2,610
1.55	1,300	3.35	2,650
1.60	1,340	3.40	2,690
1.65	1,370	3.45	2,720
1.70	1,400	3.50	2,760
1.75	1,450	3.55	2,800
1.80	1,480	3.60	2,840
1.85	1,520	3.65	2,880
1.90	1,560	3.70	2,910
1.95	1,600	3.75	2,950
2.00	1,640	3.80	2,980

GALVANIZED STEEL WIRE ARMOUR



In certain types of lead sheathed cable installations, the cable is subjected to severe longitudinal strain during or after installation, in addition to requiring armour protection to the lead sheath. This strain is due frequently to the weight of the cable itself, or subsequent tension applied to the cable by external means. It is important that these excessive strains are not applied to either the lead sheath, insulation, or conductors, and for this reason it is recommended that cables which will be subject to these conditions be steel wire armoured, so constructed that the armouring itself will take up the excessive strain.

In applying the galvanized steel wire armouring, a bedding of jute is first placed over the lead sheath, and over this bedding is helically wound a single layer of armouring, comprising a number of galvanized steel wires, the number of wires and "lay angle" being such as to completely cover the cable.

Steel wire armoured cables may be classified as follows:

(a) Cables For Vertical Installation

This class includes cables for mine shafts, bore-holes, or for installation in vertical shafts in tall buildings, and other similar applications in which the weight of the cable itself is such that injurious mechanical stress might be applied to the lead sheath, insulation, or conductors both during installation, or in being suspended vertically over a long period of time during operation.

The armouring for cables in this class is applied as described above, with the addition of a galvanized steel wire "serving" or binding about 4 inches long applied tightly over the armouring at intervals of approximately 25 feet along the cable.

At the "upper end" of the cable (the end from which the cable will be suspended), the armour wires terminate with a special "head serving". (See illustration on page 23.)

The purpose of the head serving and intermediate 4-inch servings is to ensure that the weight of the cable will be taken by the armour wires when suspended from the top both during and after installation.

The most common method of supporting this cable is to allow the bottom of the head serving to rest on a loosely fitting clamp, with further loose clamps at intervals down the cable to retain the cable in place.

The maximum length of cable which may be suspended vertically with a reasonable margin of safety is as follows:

Size of 3 Conductor Cable	Maximum Length Feet
Up to 4/0	1,000
4/0 to 500,000 c.m.	800

(b) Submarine Cables

These cables are constructed to resist mechanical damage and longitudinal stress both during and after installation, the longitudinal stresses however, in most cases, being distributed along the cable rather than being concentrated at the ends. For this reason, the head servings and intermediate servings described above are omitted, this further facilitating installation owing to the uniform smooth surface of the armouring.

Owing to the possibility of severe conditions of wear on the submerged section, the armour wires are somewhat heavier than on cables intended for vertical suspension.

Full particulars are available if desired.

DIMENSIONS OF STEEL WIRE ARMOUR

Table III. SUBMARINE CABLE

Diameter of Cable under Jute Bedding, Inches	SIZE OF ARMOUR WIRE N.B.S.	SIZE OF ARMOUR WIRE Diameter, Inches
0.000 to 0.500	15	.072
0.501 to 0.750	12	.104
0.751 to 1.250	10	.128
1.251 to 2.000	8	.160
2.001 and over	6	.192

Table IV. OTHER WIRE ARMOURED CABLES (Vertical Cables, etc.)

Diameter of Cable under Jute Bedding, Inches	SIZE OF ARMOUR WIRE N.B.S.	SIZE OF ARMOUR WIRE Diameter, Inches
0.000 to 0.400	16	.064
0.401 to 0.800	15	.072
0.801 to 1.050	14	.080
1.051 to 1.300	12	.104
1.301 to 1.700	10	.128
1.701 to 2.200	8	.160
2.201 and over	6	.192

Table V. Additions to be made to weights of plain lead sheathed cables to allow for steel wire armouring, for cables other than Submarine Type.

Diam. Over Lead, Inches	Additional Wt. per 1,000 Ft., Pounds	Diam. Over Lead, Inches	Additional Wt. per 1,000 Ft., Pounds	Diam. Over Lead, Inches	Additional Wt. per 1,000 Ft., Pounds	Diam. Over Lead, Inches	Addittional Wt. per 1,000 Ft., Pounds
.25	290	1.05	970	1.85	3,000	2.65	4,800
.30	325	1.10	1,280	1.90	3,070	2.70	4,875
.35	352	1.15	1,330	1.95	3,135	2.75	4,965
.40	388	1.20	1,375	2.00	3,210	2.80	5,040
.45	465	1.25	1,420	2.05	3,280	2.85	5,125
.50	502	1.30	1,470	2.10	3,345	2.90	5,205
.55	533	1.35	1,855	2.15	3,410	2.95	5,290
.60	570	1.40	1,915	2.20	3,480	3.00	5,365
.65	602	1.45	1,980	2.25	4,145	3.05	5,455
.70	638	1.50	2,035	2.30	4,230	3.10	5,530
.75	675	1.55	2,090	2.35	4,310	3.15	5,615
.80	707	1.60	2,145	2.40	4,395	3.20	5,695
.85	818	1.65	2,205	2.45	4,475	3.25	5,770
.90	860	1.70	2,260	2.50	4,550	....	....
.95	897	1.75	2,860	2.55	4,635	....	....
1.00	934	1.80	2,930	2.60	4,710	....	....

Table VI. Additions to be made to the overall diameters of plain lead sheathed cables to allow for steel wire armouring, for cables other than Submarine Type. (Exclusive of head servings or intermediate servings.)

Overall Diameter of Lead Sheath, Inches	Addition to Overall Diameter for Armouring, Inches
0.000 to 0.400	.288
0.401 to 0.800	.304
0.801 to 1.050	.320
1.051 to 1.300	.368
1.301 to 1.700	.416
1.701 to 2.200	.480
2.201 and up	.544

MANUFACTURE

Successful manufacture of paper insulated cable requires careful attention not only to the selection of materials, but to every detail of fabrication. Canada Wire & Cable Co. has pioneered in Canada in the development of special equipment for manufacture and testing, and has provided the plant departments with trained personnel. All men in key positions have continual contact with laboratory developments. A thorough appreciation of the significance of technical details is reflected in every phase of production. Some of the features in the manufacture and testing are worthy of mention.

TAPING

Canada Wire & Cable Co. early recognized the fundamentals of correct application of paper tape and adopted the best equipment developed for this purpose.

Some of the important features of the taping machines are of interest. The tape is applied under a pre-determined tension which remains substantially independent of the size of the roll or "pad," the speed of the machine, and of whether the machine is starting or stopping. The tension setting is under the operator's control at all times. When any tape in the machine runs out, or in case of its breaking, the machine stops automatically and almost instantaneously because of the low moment of inertia of its rotating parts. Positive drive keeps all moving parts in perfect synchronism and eliminates backlash. The taping heads on the machines have been so designed that visual inspection can be made of all tapes at their points of application as the machines are running. This important feature enables the operator to detect any tendency toward overlap or "registration," and promptly control it. Capstans of very large diameter insure freedom from strain on the insulation as the taped cable is drawn through the machine.

CABLING

The individual conductors, on large bobbins, are carried in cradles supported in the rotating frame of the cabling

machine. Smaller bobbins carry the paper or jute material used for fillers. The conductors and fillers are led to a closing die which assembles them into their correct position. An unusual feature is the design and position of the taping head which applies the binding tape to the assembled cable, very close to the point at which it emerges from the closing die. This insures the fixing of the conductors in their correct relative position before they can have any opportunity to spring apart. Once the conductors are bound tightly together in cable form, they are strong torsionally and resist any tendency toward deformation.

IMPREGNATING

The process of impregnation is essentially different for compound and oil-filled cables and should be considered accordingly.

COMPOUND-FILLED CABLES

The drying of the insulated cables prior to impregnation is accomplished in tanks by a combination of heat and vacuum. Vacua down to 1 mm. are obtained. Temperature is measured by means of thermocouples placed under the layers of cable on the reels, and is accurately controlled. Continued power factor and capacity measurements to check the progress of drying are made without interrupting the process.

When the electrical measurements show that the cable is dry, impregnating compound is introduced and pressure is built up by the use of pumps operating under oil seals which prevent the admission of air. Power factor and capacity measurements are continued until complete impregnation at the existing temperature is indicated, after which the cables are cooled and kept under compound until immediately before going to the lead presses. While cooling under pressure the impregnating compound contracts and the paper thereby takes up a maximum amount of compound. The cooling proceeds only to a point just above room temperature so as to preclude the possibility of moisture condensation on the cables as they leave the tanks. The capacity and number of impregnating tanks permit the handling of large orders and long individual lengths.

OIL-FILLED CABLES

Drying and impregnating of oil-filled cables is done after the lead sheath has been applied, a process made possible by the channels provided in these cables. Individual cable lengths are supplied with fittings at both ends which provide oil and vacuum line connections as well as the electrical connections for making power factor and capacity tests. Recording pressure and vacuum gauges as well as indicating mercury gauges are connected to each end of the cable length. The drying is accomplished by heat and vacuum, and frequent tests are made to insure the complete absence of leaks in the vacuum lines or connections. Dryness is indicated by power factor and capacity measurements, and is checked by trapping the exhaust from the cable in coils surrounded by liquid air. Small amounts of moisture, if present, are condensed and measured. The process is continued until the elimination of all traces of moisture is indicated. The impregnating oil before admission to the cable is filtered and subjected to a two-stage degasifying process. In the first stage, nearly all the dissolved air is removed by spraying the oil into a tank under vacuum. In the second stage, the oil is sprayed into another tank under extremely high vacuum which completes the removal of air. The oil is then tested for power factor at 100°C., after which it is admitted at one end of the cable, vacuum being maintained at the other end. Under these conditions the impregnation proceeds through the cable length, following which oil is passed through under pressure until the power factor of the oil at the leaving end is equal to that at the entering end. The cable is then allowed to cool to room temperature under oil pressure. From this point on throughout the life of the cable—during handling, further testing, shipment, installation, and operation—the oil in the cable is continuously under pressure supplied by means of temporary or permanent pressure reservoirs.

APPLYING LEAD SHEATH

Lead sheaths are applied by the latest types of hydraulically actuated extrusion presses. At all times during the application of the lead sheath, an accurate check is kept on

the temperature of the lead by means of a recording thermometer having thermocouples placed in several locations in the die, and in the lead itself.

TESTING

Canada Wire and Cable Co. is equipped with unusual facilities for testing paper insulated power cables. The devices employed in cable testing are too numerous to cover here. Canada Wire and Cable Co. has however, equipment for, and has actually tested power cable at over 200,000 volts at 60 cycles.

POWER FACTOR OF PAPER INSULATED LEAD COVERED CABLES

For compound-filled paper insulated power cable rated at more than 7.5 kv., and not more than 35 kv. for multi-conductor cable, or 69 kv. for single conductor cable, the power factor of the dielectric at 60 cycles shall not exceed the values given in the following table:

COMPOUND-FILLED CABLE

	POWER FACTOR %	
Temperature of Cable*	Rated Voltage 7.6-20.0 Kv. Phase to Phase	Rated Voltage 20.1 Kv. and over Phase to Phase
Room to 60°C	2.0	1.2
70°C	2.9	1.7
75°C	3.4	2.0
80°C	4.0	2.4
85°C	4.7	2.9
90°C	5.5	—

OIL-FILLED CABLE

Temperature of Cable*	POWER FACTOR %
Room to 60°C	0.60
70°C	0.75
80°C	0.90

* Uniform temperature throughout cable.

INSULATION THICKNESSES—P. I. L. C.
OIL-FILLED

SINGLE CONDUCTOR CABLES

Minimum Average Recommended Thickness
Grounded Neutral

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
15,000		110
16,000	1/0	110
17,000	to	115
18,000	750	120
19,000		125
20,000		130
21,000		135
22,000		140
23,000		145
24,000		150
25,000		155
26,000	1/0	160
27,000		160
28,000	to	165
29,000		165
	2500	
30,000		170
31,000		175
32,000		175
33,000		180
34,000		185
34,500		190
35,000		190
36,000		195
37,000		200
38,000	2/0	200
39,000		205
	to	
40,000		210
41,000	2500	215
42,000		215
43,000		220
44,000		220

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
45,000		225
46,000		225
47,000		235
48,000		240
49,000		245
50,000		245
51,000		250
52,000		250
53,000		255
54,000		255
55,000		260
56,000		265
57,000		270
58,000	2/0	275
59,000		275
	to	
60,000		280
61,000	2500	285
62,000		290
63,000		290
64,000		295
65,000		295
66,000		300
67,000		305
68,000		310
69,000		315
70,000		320
71,000		320
72,000		325
73,000		330
74,000		335

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
75,000		340
80,000		355
85,000	3/0	375
90,000		390
	to	
95,000		410
100,000	2500	430
105,000		445
110,000		465
115,000		480
120,000		500
125,000		525
130,000	4/0	535
135,000		555
	to	
138,000		560
140,000	2500	570
145,000		590
150,000		610
155,000		625
160,000	250	645
161,000	to	650
165,000	2500	660
	750	
230,000	to	925
	2500	

See Notes on Page 31

INSULATION THICKNESSES—P. I. L. C. OIL-FILLED

MULTI-CONDUCTOR CABLES

Minimum Average Recommended Thickness Grounded Neutral

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
15,000		110
16,000		110
17,000		115
18,000		120
19,000		125
	1 to	
20,000		130
21,000	600	135
22,000		140
23,000	(Round)	145
24,000		150
	or	
25,000		155
26,000	1 /0 to	160
27,000		160
28,000	600	165
29,000		165
	(Sector)	
30,000		170
31,000		175
32,000		175
33,000		180
34,000		185

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
34,500		190
35,000	1 /0 to	190
36,000	600	195
37,000	(Round)	200
	or	
38,000	2 /0 to	200
39,000	600	205
40,000	(Sector)	210
41,000		215
42,000		215
43,000	1/0 to	220
44,000	750	220
45,000	(Round)	225
	or	
46,000	2/0 to	225
47,000	750	235
48,000	(Sector)	240
49,000		245
50,000		245

Rated Voltage Phase to Phase Volts	Size B. & S. or 1000 Circular Mils	Insulation Thickness Mils
51,000		250
52,000		250
53,000	1 /0 to	255
54,000	750	255
55,000	(Round)	260
	or	
56,000	2 /0 to	265
57,000	750	270
58,000	(Sector)	275
59,000		275
60,000		280
61,000		285
62,000	2 /0 to	290
63,000	750	290
64,000	(Round)	295
65,000	or	295
	3 /0 to	
66,000	750	300
67,000	(Sector)	305
68,000		310
69,000		315

All cables have an operating tolerance of 5% above the rated voltage.

For intermediate voltages the insulation thickness for the next higher voltage is recommended.

A system is considered to have a grounded neutral if the neutral is permanently grounded to earth and if facilities are provided to insure prompt isolation of a faulty element of the system.

Single Conductor:

Values are applicable to hollow core conductors with either of the two standard internal diameters, i.e., 0.50 inch or 0.69 inch.

At 20 kv. and above, if the cross sectional area of the conductor exceeds 2,500,000 C.M., the thickness of insulation should be increased by 15 mils. Below 20 kv. the thicknesses given in the table apply for all conductor sizes up to and including 750,000 C.M. For 751,000 C.M. to 2,500,000 C.M., the thickness of insulation should be 125 mils for all voltages from 15 to 19 kv. inclusive. For conductor sizes larger than 2,500,000 C.M. in this voltage range, add an additional 15 mils to insulation thickness, giving a total of 140 mils.

Three Conductor:

Values are applicable to round or sector shaped conductors as designated.

If the cross sectional area of the conductor exceeds the maximum limits specified, the thickness of insulation should be increased as follows: Up to and including 850,000 C.M., add 15 mils. For conductor sizes larger than 850,000 C.M., add 30 mils. This method of increasing insulation thickness for large conductor sizes will in one instance call for slightly more insulation for large conductor sizes at the next lower voltage step than for the same conductor sizes at the higher voltage step. In this instance the lightest wall of insulation called for will hold for both cases.

INSULATION THICKNESSES—P. I. L. C. COMPOUND-FILLED

SINGLE OR MULTI-CONDUCTOR CABLES—TYPE "H" (Shielded)

Rated Voltage Phase to Phase	Size of Conductor B. & S. or 1,000 Circular Mils	INSULATION THICKNESS — Grounded Neutral		INSULATION THICKNESS — Ungrounded Neutral	
		Mils	Inches	Mils	Inches
1,000	8—500	65	4/64	65	4/64
	501—1,000	80	5/64	80	5/64
	Over 1,000	95	6/64	95	6/64
2,000	8—500	80	5/64	80	5/64
	501—1,000	95	6/64	95	6/64
	Over 1,000	110	7/64	110	7/64
3,000	8—500	80	5/64	80	5/64
	501—1,000	95	6/64	95	6/64
	Over 1,000	110	7/64	110	7/64
4,000	8—1,000	95	6/64	95	6/64
	Over 1,000	110	7/64	110	7/64
5,000	8—1,000	95	6/64	95	6/64
	Over 1,000	110	7/64	110	7/64
6,000	8—1,000	110	7/64	110	7/64
	Over 1,000	125	8/64	125	8/64
7,000	8 and over	125	8/64	140	9/64
8,000	6 and over	140	9/64	155	10/64
9,000	6 and over	140	9/64	170	11/64
10,000	6 and over	155	10/64	190	12/64
11,000	6 and over	155	10/64	190	12/64
12,000	6 and over	170	11/64	205	13/64
13,000	6 and over	170	11/64	220	14/64
14,000	6 and over	190	12/64	235	15/64
15,000	6 and over	205	13/64	250	16/64
16,000	4 and over	205	13/64	265	17/64
17,000	4 and over	220	14/64	280	18/64
18,000	4 and over	235	15/64	280	18/64
19,000	4 and over	235	15/64	295	19/64
20,000	2 and over	250	16/64	295	19/64
21,000	2 and over	250	16/64	315	20/64
22,000	2 and over	265	17/64	330	21/64
23,000	2 and over	265	17/64	345	22/64
24,000	2 and over	280	18/64	345	22/64
25,000	2 and over	280	18/64	360	23/64
26,000	2 and over	295	19/64	375	24/64
27,000	2 and over	295	19/64	390	25/64
28,000	1 and over	315	20/64	405	26/64
29,000	1 and over	330	21/64	420	27/64
30,000	1 and over	330	21/64	420	27/64
31,000	1/0 and over	345	22/64	440	28/64
32,000	1/0 and over	345	22/64	440	28/64
33,000	1/0 and over	360	23/64	455	29/64

All cables have an operating tolerance of 5% above the rated voltage, except those rated at 15,000 volts and below, which have no operating tolerance.

The ruling dimensions are those expressed in mils.

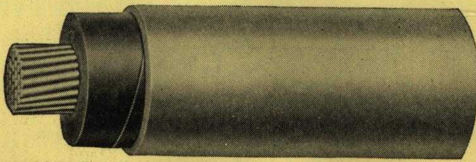
INSULATION THICKNESSES—P. I. L. C. COMPOUND-FILLED

MULTI-CONDUCTOR CABLE—BELTED TYPE

Rated Voltage Phase to Phase	Size of Conductor B. & S. or 1,000 C.M.	Insulation Thickness: Conductor Mils	Conductor Inches	Belt: Grounded Neutral Mils	Grounded Neutral Inches	Ungrounded Neutral Mils	Ungrounded Neutral Inches
1,000	8 to 4/0	65	4/64	30	2/64	30	2/64
	213 to 750	80	5/64	30	2/64	30	2/64
	Over 750	80	5/64	45	3/64	45	3/64
2,000	8 to 4/0	80	5/64	30	2/64	30	2/64
	Over 4/0	80	5/64	45	3/64	45	3/64
3,000	8 and larger	80	5/64	45	3/64	45	3/64
4,000	8 and larger	95	6/64	45	3/64	45	3/64
5,000	8 and larger	95	6/64	65	4/64	65	4/64
6,000	8 and larger	95	6/64	65	4/64	65	4/64
7,000	8 and larger	110	7/64	65	4/64	95	6/64
8,000	6 and larger	110	7/64	65	4/64	110	7/64
9,000	6 and larger	125	8/64	65	4/64	125	8/64
10,000	6 and larger	125	8/64	65	4/64	125	8/64
11,000	6 and larger	125	8/64	80	5/64	125	8/64
12,000	6 and larger	140	9/64	80	5/64	140	9/64
13,000	6 and larger	140	9/64	80	5/64	140	9/64
14,000	6 and larger	155	10/64	80	5/64	155	10/64
15,000	6 and larger	155	10/64	80	5/64	155	10/64

The ruling dimensions are those expressed in mils.

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



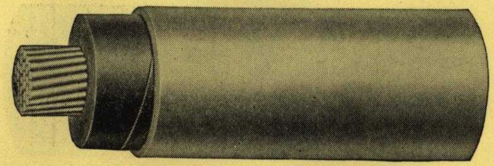
SINGLE CONDUCTOR — 1,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAAFS	8	16,510	.065	.080	.44	515	.654
LAAGT	6	26,250	.065	.080	.48	595	.410
LAAHV	4	41,740	.065	.080	.53	710	.259
LAAKY	2	66,370	.065	.080	.59	870	.162
LAALZ	1	83,690	.065	.080	.63	980	.129
LAAMB	1/0	105,500	.065	.080	.67	1,100	.102
LAANC	2/0	133,100	.065	.080	.71	1,260	.0811
LAARG	3/0	167,800	.065	.080	.76	1,430	.0642
LAASH	4/0	211,600	.065	.085	.83	1,750	.0509
LAAVK	...	250,000	.065	.085	.88	1,950	.0431
LAAWL	...	300,000	.065	.085	.93	2,180	.0360
LAAZN	...	350,000	.065	.085	.98	2,420	.0308
LABAP	...	400,000	.065	.085	1.03	2,650	.0270
LABIR	...	500,000	.065	.095	1.14	3,220	.0216
LABOS	...	600,000	.080	.095	1.25	3,750	.0180
LABPA	...	750,000	.080	.095	1.35	4,400	.0144
LABSO	...	1,000,000	.080	.100	1.52	5,630	.0108
LABUT	...	1,250,000	.095	.100	1.68	6,760	.00863
LABVY	...	1,500,000	.095	.110	1.83	7,990	.00719

SINGLE CONDUCTOR — 2,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LABYV	8	16,510	.080	.080	.47	560	.654
LACER	6	26,250	.080	.080	.51	640	.410
LACRE	4	41,740	.080	.080	.55	755	.259
LACTO	2	66,370	.080	.080	.62	920	.162
LACUV	1	83,690	.080	.080	.66	1,030	.129
LACWY	1/0	105,500	.080	.080	.70	1,160	.102
LADAR	2/0	133,100	.080	.080	.74	1,310	.0811
LADIT	3/0	167,800	.080	.085	.80	1,590	.0642
LADOV	4/0	211,600	.080	.085	.86	1,810	.0509
LADSE	...	250,000	.080	.085	.91	2,010	.0431
LADVO	...	300,000	.080	.085	.96	2,250	.0360
LADYX	...	350,000	.080	.085	1.01	2,480	.0308
LAEDS	...	400,000	.080	.085	1.06	2,720	.0270
LAEFT	...	500,000	.080	.095	1.17	3,300	.0216
LAEJY	...	600,000	.095	.095	1.28	3,830	.0180
LAELB	...	750,000	.095	.095	1.38	4,480	.0144
LAEND	...	1,000,000	.095	.100	1.55	5,720	.0108
LAEPF	...	1,250,000	.110	.110	1.73	7,060	.00863
LAEWM	...	1,500,000	.110	.110	1.86	8,090	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



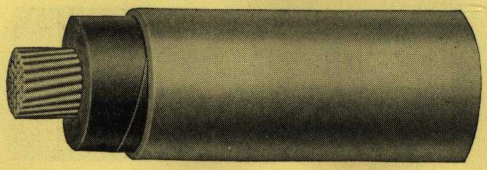
SINGLE CONDUCTOR — 3,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LABYV	8	16,510	.080	.080	.47	560	.654
LACER	6	26,250	.080	.080	.51	640	.410
LACRE	4	41,740	.080	.080	.55	755	.259
LACTO	2	66,370	.080	.080	.62	920	.162
LACUV	1	83,690	.080	.080	.66	1,030	.129
LACWY	1/0	105,500	.080	.080	.70	1,160	.102
LADAR	2/0	133,100	.080	.080	.74	1,310	.0811
LADIT	3/0	167,800	.080	.085	.80	1,590	.0642
LADOV	4/0	211,600	.080	.085	.86	1,810	.0509
LADSE	...	250,000	.080	.085	.91	2,010	.0431
LADVO	...	300,000	.080	.085	.96	2,250	.0360
LADYX	...	350,000	.080	.085	1.01	2,480	.0308
LAEDS	...	400,000	.080	.085	1.06	2,720	.0270
LAEFT	...	500,000	.080	.095	1.17	3,300	.0216
LAEJY	...	600,000	.095	.095	1.28	3,830	.0180
LAELB	...	750,000	.095	.095	1.38	4,480	.0144
LAEND	...	1,000,000	.095	.100	1.55	5,720	.0108
LAEPF	...	1,250,000	.110	.110	1.73	7,060	.00863
LAEWM	...	1,500,000	.110	.110	1.86	8,090	.00719

SINGLE CONDUCTOR — 4,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAFAS	8	16,510	.095	.080	.50	605	.654
LAFET	6	26,250	.095	.080	.54	690	.410
LAFIV	4	41,740	.095	.080	.59	805	.259
LAFSA	2	66,370	.095	.080	.65	970	.162
LAFTE	1	83,690	.095	.080	.69	1,080	.129
LAFUX	1/0	105,500	.095	.080	.73	1,210	.102
LAFWO	2/0	133,100	.095	.085	.78	1,460	.0811
LAFZY	3/0	167,800	.095	.085	.83	1,650	.0642
LAGAT	4/0	211,600	.095	.085	.88	1,860	.0509
LAGEV	...	250,000	.095	.085	.94	2,070	.0431
LAGOY	...	300,000	.095	.085	.99	2,310	.0360
LAGTA	...	350,000	.095	.085	1.04	2,550	.0308
LAGUZ	...	400,000	.095	.095	1.11	2,920	.0270
LAGVE	...	500,000	.095	.095	1.20	3,370	.0216
LAGYO	...	600,000	.095	.095	1.28	3,830	.0180
LAHAV	...	750,000	.095	.095	1.38	4,480	.0144
LAHCY	...	1,000,000	.095	.100	1.55	5,720	.0108
LAHIX	...	1,250,000	.110	.110	1.73	7,060	.00863
LAHOZ	...	1,500,000	.110	.110	1.86	8,090	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **5,000 VOLTS**

(Grounded or Ungrounded Neutral)

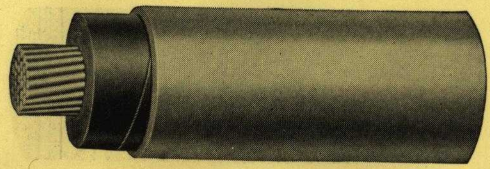
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAFAS	8	16,510	.095	.080	.50	605	.654
LAFET	6	26,250	.095	.080	.54	690	.410
LAFIV	4	41,740	.095	.080	.59	805	.259
LAFSA	2	66,370	.095	.080	.65	970	.162
LAFTE	1	83,690	.095	.080	.69	1,080	.129
LAFUX	1/0	105,500	.095	.080	.73	1,210	.102
LAFWO	2/0	133,100	.095	.085	.78	1,460	.0811
LAFZY	3/0	167,800	.095	.085	.83	1,650	.0642
LAGAT	4/0	211,600	.095	.085	.88	1,860	.0509
LAGEV	...	250,000	.095	.085	.94	2,070	.0431
LAGOY	...	300,000	.095	.085	.99	2,310	.0360
LAGTA	...	350,000	.095	.085	1.04	2,550	.0308
LAGUZ	...	400,000	.095	.095	1.11	2,920	.0270
LAGVE	...	500,000	.095	.095	1.20	3,370	.0216
LAGYO	...	600,000	.095	.095	1.28	3,830	.0180
LAHAV	...	750,000	.095	.095	1.38	4,480	.0144
LAHCY	...	1,000,000	.095	.100	1.55	5,720	.0108
LAHIX	...	1,250,000	.110	.110	1.73	7,060	.00863
LAHOZ	...	1,500,000	.110	.110	1.86	8,090	.00719

SINGLE CONDUCTOR **6,000 VOLTS**

(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAHUB	8	16,510	.110	.080	.53	655	.654
LAHVA	6	26,250	.110	.080	.57	740	.410
LAHWE	4	41,740	.110	.080	.62	855	.259
LAHZO	2	66,370	.110	.080	.68	1,020	.162
LAICS	1	83,690	.110	.080	.72	1,140	.129
LAILC	1/0	105,500	.110	.080	.76	1,270	.102
LAIRJ	2/0	133,100	.110	.085	.81	1,520	.0811
LAITL	3/0	167,800	.110	.085	.86	1,710	.0642
LAJBO	4/0	211,600	.110	.085	.92	1,940	.0509
LAJIZ	...	250,000	.110	.085	.97	2,140	.0431
LAJOB	...	300,000	.110	.085	1.02	2,380	.0360
LAJUC	...	350,000	.110	.095	1.09	2,750	.0308
LAJWA	...	400,000	.110	.095	1.14	3,000	.0270
LAJYE	...	500,000	.110	.095	1.23	3,450	.0216
LAKAY	...	600,000	.110	.095	1.31	3,900	.0180
LAKCO	...	750,000	.110	.100	1.42	4,740	.0144
LAKEZ	...	1,000,000	.110	.100	1.58	5,810	.0108
LAKIB	...	1,250,000	.125	.110	1.76	7,160	.00863
LAKOC	...	1,500,000	.125	.110	1.89	8,200	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



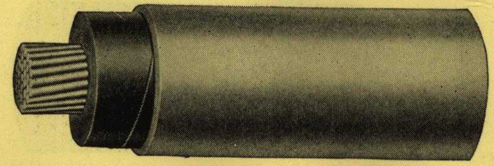
SINGLE CONDUCTOR — 7,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAKUD	8	16,510	.125	.080	.56	700	.654
LAKYA	6	26,250	.125	.080	.60	785	.410
LAKZE	4	41,740	.125	.080	.65	905	.259
LALAZ	2	66,370	.125	.080	.71	1,080	.162
LALBE	1	83,690	.125	.080	.75	1,190	.129
LALDO	1/0	105,500	.125	.085	.80	1,420	.102
LALEB	2/0	133,100	.125	.085	.84	1,580	.0811
LALIC	3/0	167,800	.125	.085	.89	1,770	.0642
LALOD	4/0	211,600	.125	.085	.95	2,000	.0509
LALUF	...	250,000	.125	.085	1.00	2,200	.0431
LALYG	...	300,000	.125	.085	1.05	2,450	.0360
LALZA	...	350,000	.125	.095	1.12	2,820	.0308
LAMAB	...	400,000	.125	.095	1.17	3,070	.0270
LAMCE	...	500,000	.125	.095	1.26	3,530	.0216
LAMEC	...	600,000	.125	.095	1.34	3,980	.0180
LAMFO	...	750,000	.125	.100	1.45	4,820	.0144
LAMID	...	1,000,000	.125	.100	1.60	5,900	.0108
LAMOF	...	1,250,000	.125	.110	1.76	7,160	.00863
LAMUG	...	1,500,000	.125	.110	1.89	8,200	.00719

SINGLE CONDUCTOR — 7,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAZTY	8	16,510	.140	.080	.59	750	.654
LAZUS	6	26,250	.140	.080	.63	840	.410
LAZYT	4	41,740	.140	.080	.68	955	.259
LEABT	2	66,370	.140	.080	.74	1,120	.162
LEAGZ	1	83,690	.140	.085	.79	1,350	.129
LEAHB	1/0	105,500	.140	.085	.83	1,480	.102
LEAKD	2/0	133,100	.140	.085	.87	1,640	.0811
LEALF	3/0	167,800	.140	.085	.92	1,840	.0642
LEAMG	4/0	211,600	.140	.085	.98	2,060	.0509
LEARL	...	250,000	.140	.085	1.03	2,270	.0431
LEASM	...	300,000	.140	.095	1.10	2,650	.0360
LEBAT	...	350,000	.140	.095	1.16	2,900	.0308
LEBEV	...	400,000	.140	.095	1.20	3,140	.0270
LEBOY	...	500,000	.140	.095	1.29	3,600	.0216
LEBTA	...	600,000	.140	.095	1.37	4,060	.0180
LEBUZ	...	750,000	.140	.100	1.48	4,900	.0144
LEBVE	...	1,000,000	.140	.100	1.63	5,990	.0108
LEBYO	...	1,250,000	.140	.110	1.79	7,260	.00863
LECAV	...	1,500,000	.140	.110	1.92	8,300	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **8,000 VOLTS**

(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LANAC	6	26,250	.140	.080	.63	850	.410
LANCA	4	41,740	.140	.080	.68	960	.259
LANED	2	66,370	.140	.080	.74	1,130	.162
LANGO	1	83,690	.140	.085	.79	1,340	.129
LANIF	1/0	105,500	.140	.085	.83	1,480	.102
LANOG	2/0	133,100	.140	.085	.87	1,640	.0811
LANUH	3/0	167,800	.140	.085	.92	1,830	.0642
LANYJ	4/0	211,600	.140	.085	.98	2,070	.0509
LAOBS	...	250,000	.140	.085	1.03	2,270	.0431
LAOCT	...	300,000	.140	.095	1.10	2,650	.0360
LAOGY	...	350,000	.140	.095	1.15	2,900	.0308
LAOHZ	...	400,000	.140	.095	1.20	3,140	.0270
LAOLD	...	500,000	.140	.095	1.29	3,600	.0216
LAONG	...	600,000	.140	.095	1.37	4,060	.0180
LAOPH	...	750,000	.140	.100	1.48	4,910	.0144
LAORK	...	1,000,000	.140	.100	1.64	5,990	.0108
LAOWP	...	1,250,000	.140	.110	1.79	7,260	.00863
LAPAP	...	1,500,000	.140	.110	1.92	8,300	.00719

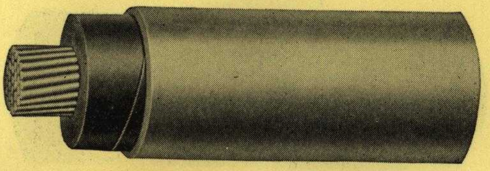
SINGLE CONDUCTOR **8,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LECIX	6	26,250	.155	.080	.66	890	.410
LECOZ	4	41,740	.155	.080	.71	1,020	.259
LECUB	2	66,370	.155	.085	.78	1,280	.162
LECVA	1	83,690	.155	.085	.82	1,400	.129
LECWE	1/0	105,500	.155	.085	.86	1,540	.102
LECZO	2/0	133,100	.155	.085	.90	1,690	.0811
LEDBO	3/0	167,800	.155	.085	.95	1,900	.0642
LEDIZ	4/0	211,600	.155	.085	1.01	2,130	.0509
LEDOB	...	250,000	.155	.085	1.06	2,330	.0431
LEDUC	...	300,000	.155	.095	1.13	2,720	.0360
LEDYE	...	350,000	.155	.095	1.19	2,970	.0308
LEEDY	...	400,000	.155	.095	1.22	3,210	.0270
LEELG	...	500,000	.155	.095	1.32	3,680	.0216
LEENJ	...	600,000	.155	.100	1.41	4,300	.0180
LEEPK	...	750,000	.155	.100	1.51	4,990	.0144
LEEWR	...	1,000,000	.155	.100	1.67	6,040	.0108
LEEZT	...	1,250,000	.155	.110	1.82	7,360	.00863
LEFAY	...	1,500,000	.155	.110	1.95	8,400	.00719

PAPER INSULATED—LEAD SHEATHED CABLE

Compound-Filled Type



SINGLE CONDUCTOR **9,000 VOLTS**

(Grounded Neutral)

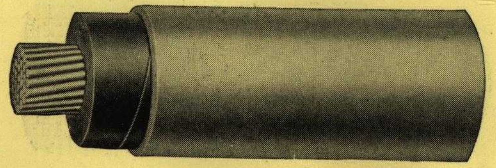
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LANAC	6	26,250	.140	.080	.63	850	.410
LANCA	4	41,740	.140	.080	.68	960	.259
LANED	2	66,370	.140	.080	.74	1,130	.162
LANGO	1	83,690	.140	.085	.79	1,340	.129
LANIF	1/0	105,500	.140	.085	.83	1,480	.102
LANOG	2/0	133,100	.140	.085	.87	1,640	.0811
LANUH	3/0	167,800	.140	.085	.92	1,830	.0642
LANYJ	4/0	211,600	.140	.085	.98	2,070	.0509
LAOBS	...	250,000	.140	.085	1.03	2,270	.0431
LAOCT	...	300,000	.140	.095	1.10	2,650	.0360
LAOGY	...	350,000	.140	.095	1.15	2,900	.0308
LAOHZ	...	400,000	.140	.095	1.20	3,140	.0270
LAOLD	...	500,000	.140	.095	1.29	3,600	.0216
LAONG	...	600,000	.140	.095	1.37	4,060	.0180
LAOPH	...	750,000	.140	.100	1.48	4,910	.0144
LAORK	...	1,000,000	.140	.100	1.64	5,990	.0108
LAOWP	...	1,250,000	.140	.110	1.79	7,260	.00863
LAPAP	...	1,500,000	.140	.110	1.92	8,300	.00719

SINGLE CONDUCTOR **9,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEFCO	6	26,250	.170	.080	.69	940	.410
LEFEZ	4	41,740	.170	.080	.74	1,065	.259
LEFIB	2	66,370	.170	.085	.81	1,340	.162
LEFOC	1	83,690	.170	.085	.85	1,460	.129
LEFUD	1/0	105,500	.170	.085	.89	1,600	.102
LEFYA	2/0	133,100	.170	.085	.93	1,760	.0811
LEGAZ	3/0	167,800	.170	.085	.98	1,960	.0642
LEGBE	4/0	211,600	.170	.085	1.04	2,200	.0509
LEGDO	...	250,000	.170	.095	1.11	2,540	.0431
LEGEB	...	300,000	.170	.095	1.17	2,790	.0360
LEGIC	...	350,000	.170	.095	1.22	3,040	.0308
LEGOD	...	400,000	.170	.095	1.26	3,290	.0270
LEGUF	...	500,000	.170	.095	1.35	3,760	.0216
LEGYG	...	600,000	.170	.100	1.44	4,400	.0180
LEGZA	...	750,000	.170	.100	1.54	5,080	.0144
LEHAB	...	1,000,000	.170	.100	1.70	6,180	.0108
LEHBA	...	1,250,000	.170	.110	1.85	7,460	.00863
LEHCE	...	1,500,000	.170	.110	1.98	8,510	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **10,000 VOLTS**

(Grounded Neutral)

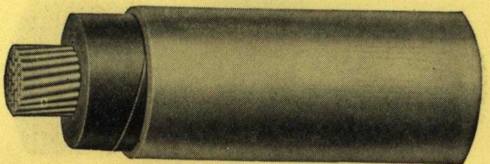
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAPEF	6	26,250	.155	.080	.66	890	.410
LAPFE	4	41,740	.155	.080	.70	1,020	.259
LAPHO	2	66,370	.155	.085	.77	1,280	.162
LAPIG	1	83,690	.155	.085	.81	1,400	.129
LAPOH	1/0	105,500	.155	.085	.86	1,540	.102
LAPUJ	2/0	133,100	.155	.085	.90	1,700	.0811
LAPYK	3/0	167,800	.155	.085	.95	1,900	.0642
LARAG	4/0	211,600	.155	.085	1.01	2,130	.0509
LARHE	...	250,000	.155	.085	1.06	2,330	.0431
LARIJ	...	300,000	.155	.095	1.13	2,720	.0360
LARKO	...	350,000	.155	.095	1.18	2,970	.0308
LARMY	...	400,000	.155	.095	1.22	3,210	.0270
LAROK	...	500,000	.155	.095	1.32	3,680	.0216
LARUL	...	600,000	.155	.100	1.41	4,310	.0180
LASAH	...	750,000	.155	.100	1.51	5,000	.0144
LASHA	...	1,000,000	.155	.100	1.66	6,080	.0108
LASIK	...	1,250,000	.155	.110	1.82	7,360	.00863
LASJE	...	1,500,000	.155	.110	1.94	8,400	.00719

SINGLE CONDUCTOR **10,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEHEC	6	26,250	.190	.080	.73	1,010	.410
LEHFO	4	41,740	.190	.085	.79	1,230	.259
LEHID	2	66,370	.190	.085	.85	1,320	.162
LEHOF	1	83,690	.190	.085	.89	1,550	.129
LEHUG	1/0	105,500	.190	.085	.93	1,690	.102
LEHYH	2/0	133,100	.190	.085	.97	1,850	.0811
LEICY	3/0	167,800	.190	.085	1.02	2,050	.0642
LEIJF	4/0	211,600	.190	.095	1.10	2,420	.0509
LEIRN	...	250,000	.190	.095	1.15	2,630	.0431
LEIXT	...	300,000	.190	.095	1.20	2,890	.0360
LEJAC	...	350,000	.190	.095	1.26	3,150	.0308
LEJCA	...	400,000	.190	.095	1.30	3,400	.0270
LEJDE	...	500,000	.190	.095	1.39	3,860	.0216
LEJED	...	600,000	.190	.100	1.48	4,510	.0180
LEJGO	...	750,000	.190	.100	1.58	5,200	.0144
LEJIF	...	1,000,000	.190	.110	1.76	6,510	.0108
LEJOG	...	1,250,000	.190	.110	1.89	7,600	.00863
LEJUH	...	1,500,000	.190	.110	2.02	8,650	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



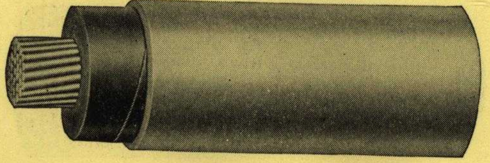
SINGLE CONDUCTOR — 11,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAPEF	6	26,250	.155	.080	.66	890	.410
LAPFE	4	41,740	.155	.080	.70	1,020	.259
LAPHO	2	66,370	.155	.085	.77	1,280	.162
LAPIG	1	83,690	.155	.085	.81	1,400	.129
LAPOH	1/0	105,500	.155	.085	.86	1,540	.102
LAPUJ	2/0	133,100	.155	.085	.90	1,700	.0811
LAPYK	3/0	167,800	.155	.085	.95	1,900	.0642
LARAG	4/0	211,600	.155	.085	1.01	2,130	.0509
LARHE	...	250,000	.155	.085	1.06	2,330	.0431
LARIJ	...	300,000	.155	.095	1.13	2,720	.0360
LARKO	...	350,000	.155	.095	1.18	2,970	.0308
LARMY	...	400,000	.155	.095	1.22	3,210	.0270
LAROK	...	500,000	.155	.095	1.32	3,680	.0216
LARUL	...	600,000	.155	.100	1.41	4,310	.0180
LASAH	...	750,000	.155	.100	1.51	5,000	.0144
LASHA	...	1,000,000	.155	.100	1.66	6,080	.0108
LASIK	...	1,250,000	.155	.110	1.82	7,360	.00863
LASJE	...	1,500,000	.155	.110	1.94	8,400	.00719

SINGLE CONDUCTOR — 11,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEHEC	6	26,250	.190	.080	.73	1,010	.410
LEHFO	4	41,740	.190	.085	.79	1,230	.259
LEHID	2	66,370	.190	.085	.85	1,320	.162
LEHOF	1	83,690	.190	.085	.89	1,550	.129
LEHUG	1/0	105,500	.190	.085	.93	1,690	.102
LEHYH	2/0	133,100	.190	.085	.97	1,850	.0811
LEICY	3/0	167,800	.190	.085	1.02	2,050	.0642
LEIJF	4/0	211,600	.190	.095	1.10	2,420	.0509
LEIRN	...	250,000	.190	.095	1.15	2,630	.0431
LEIXT	...	300,000	.190	.095	1.20	2,890	.0360
LEJAC	...	350,000	.190	.095	1.26	3,150	.0308
LEJCA	...	400,000	.190	.095	1.30	3,400	.0270
LEJDE	...	500,000	.190	.095	1.39	3,860	.0216
LEJED	...	600,000	.190	.100	1.48	4,510	.0180
LEJGO	...	750,000	.190	.100	1.58	5,200	.0144
LEJIF	...	1,000,000	.190	.110	1.76	6,510	.0108
LEJOG	...	1,250,000	.190	.110	1.89	7,600	.00863
LEJUH	...	1,500,000	.190	.110	2.02	8,650	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



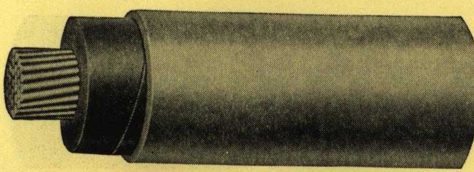
SINGLE CONDUCTOR — 12,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LASLO	6	26,250	.170	.080	.69	940	.410
LASNY	4	41,740	.170	.080	.74	1,070	.259
LASOL	2	66,370	.170	.085	.81	1,340	.162
LASUM	1	83,690	.170	.085	.85	1,460	.129
LASYN	1/0	105,500	.170	.085	.89	1,600	.102
LATAJ	2/0	133,100	.170	.085	.93	1,770	.0811
LATEK	3/0	167,800	.170	.085	.98	1,960	.0642
LATIL	4/0	211,600	.170	.085	1.04	2,200	.0509
LATJA	...	250,000	.170	.095	1.11	2,540	.0431
LATKE	...	300,000	.170	.095	1.16	2,790	.0360
LATMO	...	350,000	.170	.090	1.22	3,040	.0308
LATPY	...	400,000	.170	.095	1.26	3,290	.0270
LATYP	...	500,000	.170	.095	1.35	3,760	.0216
LAUBT	...	600,000	.170	.100	1.44	4,400	.0180
LAUFY	...	750,000	.170	.100	1.54	5,080	.0144
LAUGZ	...	1,000,000	.170	.100	1.70	6,180	.0108
LAUHB	...	1,250,000	.170	.110	1.85	7,460	.00863
	...	1,500,000	.170	.110	1.98	8,510	.00719

SINGLE CONDUCTOR — 12,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEJYJ	6	26,250	.205	.080	.76	1,070	.410
LEKAD	4	41,740	.205	.085	.82	1,300	.259
LEKDA	2	66,370	.205	.085	.88	1,490	.162
LEKEF	1	83,690	.205	.085	.92	1,610	.129
LEKFE	1/0	105,500	.205	.085	.96	1,750	.102
LEKHO	2/0	133,100	.205	.085	1.00	1,910	.0811
LEKIG	3/0	167,800	.205	.085	1.05	2,120	.0642
LEKOH	4/0	211,600	.205	.095	1.13	2,490	.0509
LEKUJ	...	250,000	.205	.095	1.18	2,710	.0431
LEKYK	...	300,000	.205	.095	1.23	2,970	.0360
LELAF	...	350,000	.205	.095	1.29	3,220	.0308
LELEG	...	400,000	.205	.095	1.33	3,480	.0270
LELFA	...	500,000	.205	.100	1.43	4,120	.0216
LELGE	...	600,000	.205	.100	1.51	4,600	.0180
LELJO	...	750,000	.205	.100	1.61	5,290	.0144
LELLY	...	1,000,000	.205	.110	1.79	6,610	.0108
LELOJ	...	1,250,000	.205	.110	1.92	7,700	.00863
LELUK	...	1,500,000	.205	.115	2.06	9,000	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **13,000 VOLTS**

(Grounded Neutral)

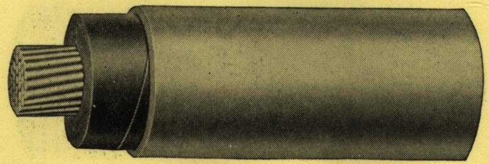
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LASLO	6	26,250	.170	.080	.69	940	.410
LASNY	4	41,740	.170	.080	.74	1,070	.259
LASOL	2	66,370	.170	.085	.81	1,340	.162
LASUM	1	83,690	.170	.085	.85	1,460	.129
LASYN	1/0	105,500	.170	.085	.89	1,600	.102
LATAJ	2/0	133,100	.170	.085	.93	1,770	.0811
LATEK	3/0	167,800	.170	.085	.98	1,960	.0642
LATIL	4/0	211,600	.170	.085	1.04	2,200	.0509
LATJA	...	250,000	.170	.095	1.11	2,540	.0431
LATKE	...	300,000	.170	.095	1.16	2,790	.0360
LATMO	...	350,000	.170	.095	1.22	3,040	.0308
LATPY	...	400,000	.170	.095	1.26	3,290	.0270
LATYP	...	500,000	.170	.095	1.35	3,760	.0216
LAUBT	...	600,000	.170	.100	1.44	4,400	.0180
LAUFY	...	750,000	.170	.100	1.54	5,080	.0144
LAUGZ	...	1,000,000	.170	.100	1.70	6,180	.0108
LAUHB	...	1,250,000	.170	.110	1.85	7,460	.00863
	...	1,500,000	.170	.110	1.98	8,510	.00719

SINGLE CONDUCTOR **13,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LELYL	6	26,250	.220	.085	.80	1,220	.410
LEMAG	4	41,740	.220	.085	.85	1,370	.259
LEMGA	2	66,370	.220	.085	.91	1,540	.162
LEMHE	1	83,690	.220	.085	.95	1,670	.129
LEMIJ	1/0	105,500	.220	.085	.99	1,810	.102
LEMKO	2/0	133,100	.220	.085	1.03	1,980	.0811
LEMMY	3/0	167,800	.220	.095	1.10	2,320	.0642
LEMOK	4/0	211,600	.220	.095	1.16	2,570	.0509
LEMUL	...	250,000	.220	.095	1.21	2,780	.0431
LENAH	...	300,000	.220	.095	1.26	3,040	.0360
LENHA	...	350,000	.220	.095	1.32	3,300	.0308
LENIK	...	400,000	.220	.095	1.36	3,560	.0270
LENJE	...	500,000	.220	.100	1.46	4,200	.0216
LENLO	...	600,000	.220	.100	1.54	4,690	.0180
LENNY	...	750,000	.220	.100	1.64	5,380	.0144
LENOL	...	1,000,000	.220	.110	1.82	6,710	.0108
LENUM	...	1,250,000	.220	.110	1.95	7,800	.00863
LENYN	...	1,500,000	.220	.115	2.09	9,110	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR (Grounded Neutral) **14,000 VOLTS**

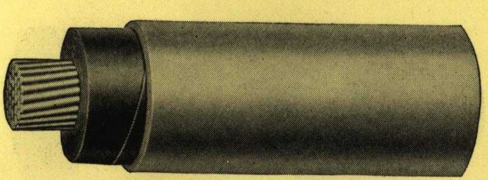
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAUKD	6	26,250	.190	.080	.73	1,020	.410
LAULF	4	41,740	.190	.085	.79	1,230	.259
LAUMG	2	66,370	.190	.085	.85	1,420	.162
LAURL	1	83,690	.190	.085	.89	1,540	.129
LAUSM	1/0	105,500	.190	.085	.93	1,690	.102
LAVAK	2/0	133,100	.190	.085	.97	1,850	.0811
LAVEL	3/0	167,800	.190	.085	1.02	2,050	.0642
LAVKA	4/0	211,600	.190	.095	1.10	2,420	.0509
LAVLE	...	250,000	.190	.095	1.15	2,640	.0431
LAVNO	...	300,000	.190	.095	1.20	2,890	.0360
LAVON	...	350,000	.190	.095	1.25	3,150	.0308
LAVUP	...	400,000	.190	.095	1.30	3,400	.0270
LAWAL	...	500,000	.190	.095	1.39	3,870	.0216
LAWEM	...	600,000	.190	.100	1.48	4,510	.0180
LAWLA	...	750,000	.190	.100	1.58	5,200	.0144
LAWME	...	1,000,000	.190	.110	1.76	6,510	.0108
LAWOP	...	1,250,000	.190	.110	1.89	7,600	.00863
LAWPO	...	1,500,000	.190	.110	2.02	8,650	.00719

SINGLE CONDUCTOR (Ungrounded Neutral) **14,000 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEOBY	6	26,250	.235	.085	.83	1,280	.410
LEOGD	4	41,740	.235	.085	.88	1,410	.259
LEOLJ	2	66,370	.235	.085	.94	1,610	.162
LEORP	1	83,690	.235	.085	.98	1,730	.129
LEOVS	1/0	105,500	.235	.085	1.02	1,880	.102
LAOWT	2/0	133,100	.235	.085	1.06	2,060	.0811
LEPAJ	3/0	167,800	.235	.095	1.13	2,390	.0642
LEPEK	4/0	211,600	.235	.095	1.19	2,640	.0509
LEPIL	...	250,000	.235	.095	1.24	2,850	.0431
LEPJA	...	300,000	.235	.095	1.29	3,120	.0360
LEPKE	...	350,000	.235	.095	1.35	3,380	.0308
LEPMO	...	400,000	.235	.095	1.39	3,640	.0270
LEPPY	...	500,000	.235	.100	1.49	4,290	.0216
LEPYP	...	600,000	.235	.100	1.57	4,780	.0180
LERAL	...	750,000	.235	.100	1.67	5,480	.0144
LEREM	...	1,000,000	.235	.110	1.85	6,810	.0108
LERLA	...	1,250,000	.235	.110	1.98	7,910	.00863
LERME	...	1,500,000	.235	.115	2.12	9,230	.00719

PAPER INSULATED—LEAD SHEATHED CABLE

Compound-Filled Type



SINGLE CONDUCTOR — **15,000 VOLTS**

(Grounded Neutral)

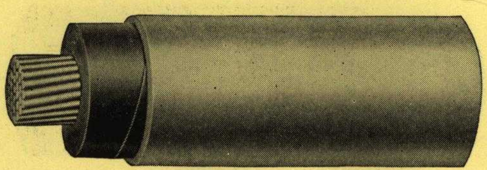
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LAWRY	6	26,250	.205	.080	.76	1,070	.410
LAWYR	4	41,740	.205	.085	.82	1,300	.259
LAYAM	2	66,370	.205	.085	.88	1,480	.162
LAYEN	1	83,690	.205	.085	.92	1,610	.129
LAYIB	1/0	105,500	.205	.085	.96	1,750	.102
LAYJD	2/0	133,100	.205	.085	1.00	1,920	.0811
LAYLG	3/0	167,800	.205	.085	1.05	2,120	.0642
LAYMA	4/0	211,600	.205	.095	1.13	2,490	.0509
LAYNE	...	250,000	.205	.095	1.18	2,700	.0431
LAYSY	...	300,000	.205	.095	1.23	2,970	.0360
LAYUR	...	350,000	.205	.095	1.28	3,220	.0308
LAYZT	...	400,000	.205	.095	1.33	3,480	.0270
LAZAN	...	500,000	.205	.100	1.43	4,120	.0216
LAZEP	...	600,000	.205	.100	1.51	4,600	.0180
LAZNA	...	750,000	.205	.100	1.61	5,290	.0144
LAZOR	...	1,000,000	.205	.110	1.79	6,610	.0108
LAZPE	...	1,250,000	.205	.110	1.92	7,700	.00863
LAZRO	...	1,500,000	.205	.115	2.06	8,950	.00719

SINGLE CONDUCTOR — **15,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds / 1,000′	Average Resistance Ohms /1,000′ @ 25°C.
LEROP	6	26,250	.250	.085	.86	1,340	.410
LERPO	4	41,740	.250	.085	.91	1,480	.259
LARYR	2	66,370	.250	.085	.97	1,670	.162
LESAM	1	83,690	.250	.085	1.01	1,800	.129
LESIP	1/0	105,500	.250	.085	1.05	1,950	.102
LESMA	2/0	133,100	.250	.095	1.11	2,250	.0811
LESNE	3/0	167,800	.250	.095	1.16	2,460	.0642
LESSY	4/0	211,600	.250	.095	1.22	2,720	.0509
LESUR	...	250,000	.250	.095	1.27	2,930	.0431
LESYS	...	300,000	.250	.095	1.32	3,200	.0360
LETAN	...	350,000	.250	.095	1.38	3,460	.0308
LETEP	...	400,000	.250	.100	1.43	3,880	.0270
LETNA	...	500,000	.250	.100	1.52	4,370	.0216
LETOR	...	600,000	.250	.100	1.60	4,870	.0180
LETPE	...	750,000	.250	.100	1.70	5,570	.0144
LETRO	...	1,000,000	.250	.110	1.88	6,910	.0108
LETUS	...	1,250,000	.250	.110	2.01	8,010	.00863
LETYT	...	1,500,000	.250	.115	2.15	9,340	.00719

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **16,000 VOLTS**

(Grounded Neutral)

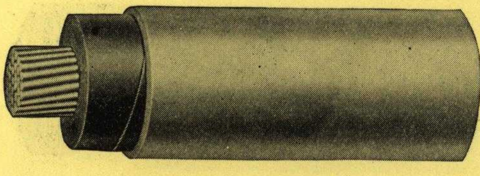
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAACH	4	41,740	.205	.085	.82	1,300	.259
NAAFK	2	66,370	.205	.085	.88	1,480	.162
NAAHM	1	83,690	.205	.085	.92	1,600	.129
NAAJN	1/0	105,500	.205	.085	.96	1,750	.102
NAANS	2/0	133,100	.205	.085	1.00	1,920	.0811
NAAPT	3/0	167,800	.205	.085	1.05	2,120	.0642
NAASY	4/0	211,600	.205	.095	1.13	2,500	.0509
NAATZ	...	250,000	.205	.095	1.18	2,710	.0431
NAAVB	...	300,000	.205	.095	1.23	2,980	.0360
NAAXD	...	350,000	.205	.095	1.29	3,230	.0308
NABAG	...	400,000	.205	.095	1.33	3,490	.0270
NABGA	...	500,000	.205	.100	1.43	4,130	.0216
NABHE	...	600,000	.205	.100	1.51	4,600	.0180
NABIJ	...	750,000	.205	.100	1.61	5,300	.0144
NABKO	...	1,000,000	.205	.110	1.79	6,620	.0108

SINGLE CONDUCTOR **16,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAVYH	4	41,740	.265	.085	.94	1,550	.259
NAWAC	2	66,370	.265	.085	1.00	1,740	.162
NAWCA	1	83,690	.265	.085	1.04	1,870	.129
NAWDE	1/0	105,500	.265	.095	1.10	2,150	.102
NAWED	2/0	133,100	.265	.095	1.14	2,330	.0811
NAWGO	3/0	167,800	.265	.095	1.19	2,540	.0642
NAWIF	4/0	211,600	.265	.095	1.25	2,800	.0509
NAWOG	...	250,000	.265	.095	1.30	3,020	.0431
NAWUH	...	300,000	.265	.095	1.35	3,280	.0360
NAWYJ	...	350,000	.265	.100	1.42	3,720	.0308
NAYAD	...	400,000	.265	.100	1.46	3,980	.0270
NAYDA	...	500,000	.265	.100	1.55	4,480	.0216
NAYEF	...	600,000	.265	.100	1.63	4,960	.0180
NAYFE	...	750,000	.265	.110	1.75	5,890	.0144
NAYHO	...	1,000,000	.265	.110	1.91	7,030	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



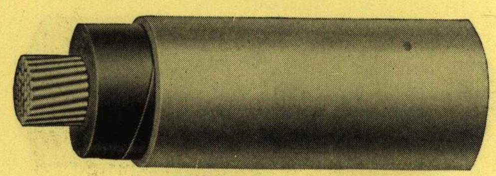
SINGLE CONDUCTOR — 17,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NABMY	4	41,740	.220	.085	.85	1,360	.259
NABOK	2	66,370	.220	.085	.91	1,550	.162
NABUL	1	83,690	.220	.085	.95	1,660	.129
NACAH	1/0	105,500	.220	.085	.99	1,810	.102
NACHA	2/0	133,100	.220	.085	1.03	1,980	.0811
NACIK	3/0	167,800	.220	.095	1.10	2,320	.0642
NACJE	4/0	211,600	.220	.095	1.16	2,580	.0509
NACLO	...	250,000	.220	.095	1.21	2,790	.0431
NACOL	...	300,000	.220	.095	1.26	3,050	.0360
NACUM	...	350,000	.220	.095	1.32	3,310	.0308
NACYN	...	400,000	.220	.095	1.36	3,570	.0270
NADAJ	...	500,000	.220	.100	1.46	4,210	.0216
NADEK	...	600,000	.220	.100	1.54	4,690	.0180
NADIL	...	750,000	.220	.100	1.64	5,400	.0144
NADJA	...	1,000,000	.220	.110	1.82	6,730	.0108

SINGLE CONDUCTOR — 17,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAYIG	4	41,740	.280	.085	.97	1,610	.259
NAYKY	2	66,370	.280	.085	1.03	1,800	.162
NAYNZ	1	83,690	.280	.085	1.07	1,930	.129
NAYOH	1/0	105,500	.280	.095	1.13	2,220	.102
NAYUJ	2/0	133,100	.280	.095	1.17	2,400	.0811
NAZAF	3/0	167,800	.280	.095	1.22	2,620	.0642
NAZEG	4/0	211,600	.280	.095	1.28	2,880	.0509
NAZFA	...	250,000	.280	.095	1.33	3,100	.0431
NAZGE	...	300,000	.280	.095	1.38	3,370	.0360
NAZJO	...	350,000	.280	.100	1.45	3,800	.0308
NAZLY	...	400,000	.280	.100	1.49	4,070	.0270
NAZOJ	...	500,000	.280	.100	1.58	4,570	.0216
NAZUK	...	600,000	.280	.100	1.66	5,060	.0180
NAZYL	...	750,000	.280	.110	1.78	5,990	.0144
NEAHR	...	1,000,000	.280	.110	1.94	7,140	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



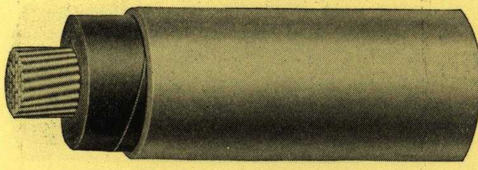
SINGLE CONDUCTOR — 18,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NADKE	4	41,740	.235	.085	.88	1,420	.259
NADMO	2	66,370	.235	.085	.94	1,610	.162
NADYP	1	83,690	.235	.085	.98	1,730	.129
NAEGM	1/0	105,500	.235	.085	1.02	1,880	.102
NAEJP	2/0	133,100	.235	.085	1.06	2,050	.0811
NAEMS	3/0	167,800	.235	.095	1.13	2,390	.0642
NAENT	4/0	211,600	.235	.095	1.19	2,650	.0509
NAERY	...	250,000	.235	.095	1.24	2,860	.0431
NAEWD	...	300,000	.235	.095	1.29	3,130	.0360
NAFAK	...	350,000	.235	.095	1.35	3,390	.0308
NAFEL	...	400,000	.235	.095	1.39	3,650	.0270
NAFKA	...	500,000	.235	.100	1.49	4,300	.0216
NAFLE	...	600,000	.235	.100	1.57	4,780	.0180
NAFNO	...	750,000	.235	.100	1.67	5,490	.0144
NAFON	...	1,000,000	.235	.110	1.85	6,830	.0108

SINGLE CONDUCTOR — 18,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAYIG	4	41,740	.280	.085	.97	1,610	.259
NAYKY	2	66,370	.280	.085	1.03	1,800	.162
NAYNZ	1	83,690	.280	.085	1.07	1,930	.129
NAYOH	1/0	105,500	.280	.095	1.13	2,220	.102
NAYUJ	2/0	133,100	.280	.095	1.17	2,400	.0811
NAZAF	3/0	167,800	.280	.095	1.22	2,620	.0642
NAZEG	4/0	211,600	.280	.095	1.28	2,880	.0509
NAZFA	...	250,000	.280	.095	1.33	3,100	.0431
NAZGE	...	300,000	.280	.095	1.38	3,370	.0360
NAZJO	...	350,000	.280	.100	1.45	3,800	.0308
NAZLY	...	400,000	.280	.100	1.49	4,070	.0270
NAZOJ	...	500,000	.280	.100	1.58	4,570	.0216
NAZUK	...	600,000	.280	.100	1.66	5,060	.0180
NAZYL	...	750,000	.280	.110	1.78	5,990	.0144
NEAHR	...	1,000,000	.280	.110	1.94	7,140	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **19,000 VOLTS**

(Grounded Neutral)

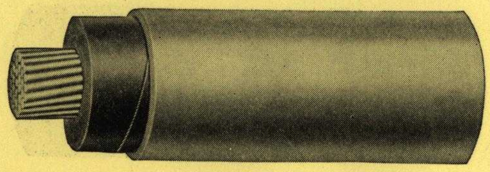
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NADKE	4	41,740	.235	.085	.88	1,420	.259
NADMO	2	66,370	.235	.085	.94	1,610	.162
NADYP	1	83,690	.235	.085	.98	1,730	.129
NAEGM	1/0	105,500	.235	.085	1.02	1,880	.102
NAEJP	2/0	133,100	.235	.085	1.06	2,050	.0811
NAEMS	3/0	167,800	.235	.095	1.13	2,390	.0642
NAENT	4/0	211,600	.235	.095	1.19	2,650	.0509
NAERY	...	250,000	.235	.095	1.24	2,860	.0431
NAEWD	...	300,000	.235	.095	1.29	3,130	.0360
NAFAK	...	350,000	.235	.095	1.35	3,390	.0308
NAFEL	...	400,000	.235	.095	1.39	3,650	.0270
NAFKA	...	500,000	.235	.100	1.49	4,300	.0216
NAFLE	...	600,000	.235	.100	1.57	4,780	.0180
NAFNO	...	750,000	.235	.100	1.67	5,490	.0144
NAFON	...	1,000,000	.235	.110	1.85	6,830	.0108

SINGLE CONDUCTOR **19,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEAJS	4	41,740	.295	.085	1.00	1,680	.259
NEAKT	2	66,370	.295	.085	1.06	1,870	.162
NEALV	1	83,690	.295	.095	1.12	2,130	.129
NEANY	1/0	105,500	.295	.095	1.16	2,290	.102
NEAPZ	2/0	133,100	.295	.095	1.20	2,480	.0811
NEARC	3/0	167,800	.295	.095	1.25	2,690	.0642
NEASD	4/0	211,600	.295	.095	1.31	2,960	.0509
NEAVG	...	250,000	.295	.095	1.36	3,170	.0431
NEAZK	...	300,000	.295	.100	1.42	3,620	.0360
NEBAL	...	350,000	.295	.100	1.48	3,890	.0308
NEBEM	...	400,000	.295	.100	1.52	4,160	.0270
NEBLA	...	500,000	.295	.100	1.61	4,660	.0216
NEBME	...	600,000	.295	.100	1.69	5,150	.0180
NEBOP	...	750,000	.295	.110	1.82	6,090	.0144
NEBPO	...	1,000,000	.295	.110	1.98	7,240	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **20,000 VOLTS**

(Grounded Neutral)

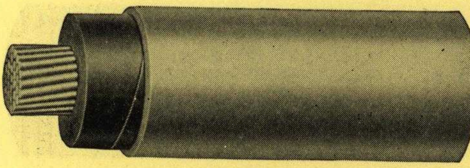
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAFUP	2	66,370	.250	.085	.97	1,670	.162
NAGAL	1	83,690	.250	.085	1.01	1,800	.129
NAGEM	1/0	105,500	.250	.085	1.05	1,950	.102
NAGLA	2/0	133,100	.250	.095	1.11	2,250	.0811
NAGME	3/0	167,800	.250	.095	1.16	2,470	.0642
NAGOP	4/0	211,600	.250	.095	1.22	2,730	.0509
NAGYR	...	250,000	.250	.095	1.27	3,050	.0431
NAHAM	...	300,000	.250	.095	1.32	3,220	.0360
NAHIP	...	350,000	.250	.095	1.38	3,470	.0308
NAHMA	...	400,000	.250	.100	1.43	3,890	.0270
NAHNE	...	500,000	.250	.100	1.52	4,390	.0216
NAHUR	...	600,000	.250	.100	1.60	4,880	.0180
NAHYS	...	750,000	.250	.100	1.70	5,580	.0144
NAICK	...	1,000,000	.250	.110	1.88	6,930	.0108

SINGLE CONDUCTOR **20,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEAKT	2	66,370	.295	.085	1.06	1,870	.162
NEALV	1	83,690	.295	.095	1.12	2,130	.129
NEANY	1/0	105,500	.295	.095	1.16	2,290	.102
NEAPZ	2/0	133,100	.295	.095	1.20	2,480	.0811
NEARC	3/0	167,800	.295	.095	1.25	2,690	.0642
NEASD	4/0	211,600	.295	.095	1.31	2,960	.0509
NEAVG	...	250,000	.295	.095	1.36	3,170	.0431
NEAZK	...	300,000	.295	.100	1.42	3,620	.0360
NEBAL	...	350,000	.295	.100	1.48	3,890	.0308
NEBEM	...	400,000	.295	.100	1.52	4,160	.0270
NEBLA	...	500,000	.295	.100	1.61	4,660	.0216
NEBME	...	600,000	.295	.100	1.69	5,150	.0180
NEBOP	...	750,000	.295	.110	1.82	6,090	.0144
NEBPO	...	1,000,000	.295	.110	1.98	7,240	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **21,000 VOLTS**

(Grounded Neutral)

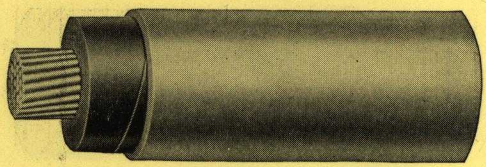
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAFUP	2	66,370	.250	.085	.97	1,670	.162
NAGAL	1	83,690	.250	.085	1.01	1,800	.129
NAGEM	1/0	105,500	.250	.085	1.05	1,950	.102
NAGLA	2/0	133,100	.250	.095	1.11	2,250	.0811
NAGME	3/0	167,800	.250	.095	1.16	2,470	.0642
NAGOP	4/0	211,600	.250	.095	1.22	2,730	.0509
NAGYR	...	250,000	.250	.095	1.27	3,050	.0431
NAHAM	...	300,000	.250	.095	1.32	3,220	.0360
NAHIP	...	350,000	.250	.095	1.38	3,470	.0308
NAHMA	...	400,000	.250	.100	1.43	3,890	.0270
NAHNE	...	500,000	.250	.100	1.52	4,390	.0216
NAHUR	...	600,000	.250	.100	1.60	4,880	.0180
NAHYS	...	750,000	.250	.100	1.70	5,580	.0144
NAICK	...	1,000,000	.250	.110	1.88	6,930	.0108

SINGLE CONDUCTOR **21,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEPRY	2	66,370	.315	.095	1.12	2,090	.162
NEPYR	1	83,690	.315	.095	1.16	2,230	.129
NECAM	1/0	105,500	.315	.095	1.20	2,390	.102
NECEN	2/0	133,100	.315	.095	1.24	2,580	.0811
NECIP	3/0	167,800	.315	.095	1.29	2,780	.0642
NECNE	4/0	211,600	.315	.095	1.35	3,060	.0509
NECSY	...	250,000	.315	.100	1.41	3,450	.0431
NECUR	...	300,000	.315	.100	1.46	3,730	.0360
NECYS	...	350,000	.315	.100	1.52	4,010	.0308
NEDAN	...	400,000	.315	.100	1.56	4,270	.0270
NEDEP	...	500,000	.315	.100	1.65	4,780	.0216
NEDNA	...	600,000	.315	.110	1.75	5,490	.0180
NEDOR	...	750,000	.315	.110	1.85	6,230	.0144
NEDPE	...	1,000,000	.315	.110	2.01	7,380	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



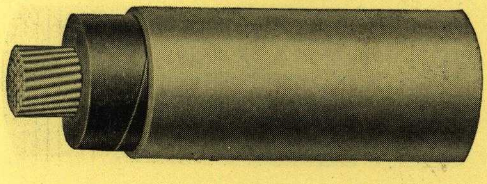
SINGLE CONDUCTOR — 22,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NAIGN	2	66,370	.265	.085	1.00	1,740	.162
NAIRZ	1	83,690	.265	.085	1.04	1,870	.129
NAJAN	1/0	105,500	.265	.095	1.10	2,150	.102
NAJEP	2/0	133,100	.265	.095	1.14	2,330	.0811
NAJNA	3/0	167,800	.265	.095	1.19	2,540	.0642
NAJOR	4/0	211,600	.265	.095	1.25	2,800	.0509
NAJPE	...	250,000	.265	.095	1.30	3,020	.0431
NAJRO	...	300,000	.265	.095	1.35	3,280	.0360
NAJTY	...	350,000	.265	.100	1.42	3,720	.0308
NAJUS	...	400,000	.265	.100	1.46	3,980	.0270
NAJYT	...	500,000	.265	.100	1.55	4,480	.0216
NAKAP	...	600,000	.265	.100	1.63	4,960	.0180
NAKIR	...	750,000	.265	.110	1.75	5,890	.0144
NAKOS	...	1,000,000	.265	.110	1.91	7,030	.0108

SINGLE CONDUCTOR — 22,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEDRO	2	66,370	.330	.095	1.15	2,160	.162
NEDUS	1	83,690	.330	.095	1.19	2,300	.129
NEDYT	1/0	105,500	.330	.095	1.23	2,470	.102
NEEJT	2/0	133,100	.330	.095	1.27	2,660	.0811
NEEMY	3/0	167,800	.330	.095	1.32	2,870	.0642
NEENZ	4/0	211,600	.330	.095	1.38	3,140	.0509
NEERD	...	250,000	.330	.100	1.44	3,540	.0431
NEEWJ	...	300,000	.330	.100	1.49	3,820	.0360
NEFAP	...	350,000	.330	.100	1.55	4,090	.0308
NEFIR	...	400,000	.330	.100	1.59	4,370	.0270
NEFOS	...	500,000	.330	.100	1.68	4,880	.0216
NEFPA	...	600,000	.330	.110	1.78	5,590	.0180
NEFSO	...	750,000	.330	.110	1.88	6,330	.0144
NEFUT	...	1,000,000	.330	.115	2.08	7,740	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **23,000 VOLTS**

(Grounded Neutral)

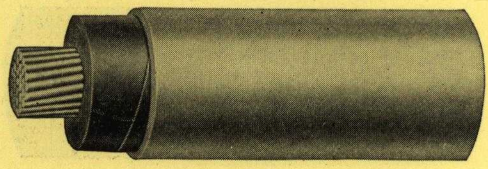
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NAIGN	2	66,370	.265	.085	1.00	1,740	.162
NAIRZ	1	83,690	.265	.085	1.04	1,870	.129
NAJAN	1/0	105,500	.265	.095	1.10	2,150	.102
NAJEP	2/0	133,100	.265	.095	1.14	2,330	.0811
NAJNA	3/0	167,800	.265	.095	1.19	2,540	.0642
NAJOR	4/0	211,600	.265	.095	1.25	2,800	.0509
NAJPE	...	250,000	.265	.095	1.30	3,020	.0431
NAJRO	...	300,000	.265	.095	1.35	3,280	.0360
NAJTY	...	350,000	.265	.100	1.42	3,720	.0308
NAJUS	...	400,000	.265	.100	1.46	3,980	.0270
NAJYT	...	500,000	.265	.100	1.55	4,480	.0216
NAKAP	...	600,000	.265	.100	1.63	4,960	.0180
NAKIR	...	750,000	.265	.110	1.75	5,890	.0144
NAKOS	...	1,000,000	.265	.110	1.91	7,030	.0108

SINGLE CONDUCTOR **23,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEFVY	2	66,370	.345	.095	1.18	2,240	.162
NEFYV	1	83,690	.345	.095	1.22	2,380	.129
NEGTO	1/0	105,500	.345	.095	1.26	2,550	.102
NEGUV	2/0	133,100	.345	.095	1.30	2,730	.0811
NEGWY	3/0	167,800	.345	.095	1.35	2,950	.0642
NEHAR	4/0	211,600	.345	.100	1.42	3,390	.0509
NEHIT	...	250,000	.345	.100	1.47	3,620	.0431
NEHOV	...	300,000	.345	.100	1.52	3,910	.0360
NEHRA	...	350,000	.345	.100	1.58	4,190	.0308
NEHSE	...	400,000	.345	.100	1.62	4,460	.0270
NEHVO	...	500,000	.345	.110	1.73	5,180	.0216
NEHYX	...	600,000	.345	.110	1.81	5,690	.0180
NEIGS	...	750,000	.345	.110	1.91	6,430	.0144
NEIRF	...	1,000,000	.345	.115	2.08	7,850	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR — 24,000 VOLTS
(Grounded Neutral)

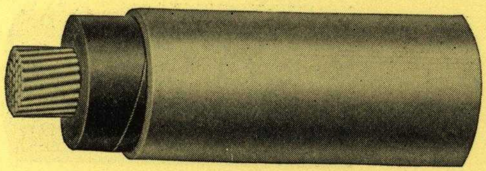
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAKPA	2	66,370	.280	.085	1.03	1,800	.162
NAKSO	1	83,690	.280	.085	1.07	1,930	.129
NAKUT	1/0	105,500	.280	.095	1.13	2,220	.102
NAKVY	2/0	133,100	.280	.095	1.17	2,400	.0811
NAKYV	3/0	167,800	.280	.095	1.22	2,620	.0642
NALER	4/0	211,600	.280	.095	1.28	2,880	.0509
NALRE	...	250,000	.280	.095	1.33	3,100	.0431
NALTO	...	300,000	.280	.095	1.38	3,370	.0360
NALUV	...	350,000	.280	.100	1.45	3,800	.0308
NALWY	...	400,000	.280	.100	1.49	4,070	.0270
NAMAR	...	500,000	.280	.100	1.58	4,570	.0216
NAMIT	...	600,000	.280	.100	1.66	5,060	.0180
NAMOV	...	750,000	.280	.110	1.78	5,990	.0144
NAMRA	...	1,000,000	.280	.110	1.94	7,140	.0108

SINGLE CONDUCTOR — 24,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEFVY	2	66,370	.345	.095	1.18	2,240	.162
NEFYV	1	83,690	.345	.095	1.22	2,380	.129
NEGTO	1/0	105,500	.345	.095	1.26	2,550	.102
NEGUV	2/0	133,100	.345	.095	1.30	2,730	.0811
NEGWY	3/0	167,800	.345	.095	1.35	2,950	.0642
NEHAR	4/0	211,600	.345	.100	1.42	3,390	.0509
NEHIT	...	250,000	.345	.100	1.47	3,620	.0431
NEHOV	...	300,000	.345	.100	1.52	3,910	.0360
NEHRA	...	350,000	.345	.100	1.58	4,190	.0308
NEHSE	...	400,000	.345	.100	1.62	4,460	.0270
NEHVO	...	500,000	.345	.110	1.73	5,180	.0216
NEHYX	...	600,000	.345	.110	1.81	5,690	.0180
NEIGS	...	750,000	.345	.110	1.91	6,430	.0144
NEIRF	...	1,000,000	.345	.115	2.08	7,850	.0108

PAPER INSULATED—LEAD SHEATHED CABLE

Compound-Filled Type



SINGLE CONDUCTOR — 25,000 VOLTS

(Grounded Neutral)

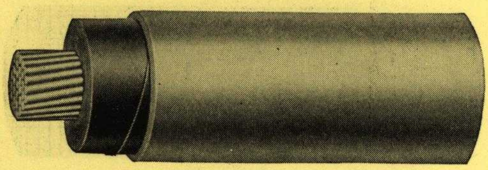
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAKPA	2	66,370	.280	.085	1.03	1,800	.162
NAKSO	1	83,690	.280	.085	1.07	1,930	.129
NAKUT	1/0	105,500	.280	.095	1.13	2,220	.102
NAKVY	2/0	133,100	.280	.095	1.17	2,400	.0811
NAKYV	3/0	167,800	.280	.095	1.22	2,620	.0642
NALER	4/0	211,600	.280	.095	1.28	2,880	.0509
NALRE	...	250,000	.280	.095	1.33	3,100	.0431
NALTO	...	300,000	.280	.095	1.38	3,370	.0360
NALUV	...	350,000	.280	.100	1.45	3,800	.0308
NALWY	...	400,000	.280	.100	1.49	4,070	.0270
NAMAR	...	500,000	.280	.100	1.58	4,570	.0216
NAMIT	...	600,000	.280	.100	1.66	5,060	.0180
NAMOV	...	750,000	.280	.110	1.78	5,990	.0144
NAMRA	...	1,000,000	.280	.110	1.94	7,140	.0108

SINGLE CONDUCTOR — 25,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEITH	2	66,370	.360	.095	1.21	2,310	.162
NEIZM	1	83,690	.360	.095	1.25	2,450	.129
NEJAS	1/0	105,500	.360	.095	1.29	2,620	.102
NEJET	2/0	133,100	.360	.095	1.33	2,810	.0811
NEJIV	3/0	167,800	.360	.095	1.38	3,030	.0642
NEJSA	4/0	211,600	.360	.100	1.45	3,380	.0509
NEJTE	...	250,000	.360	.100	1.50	3,700	.0431
NEJUX	...	300,000	.360	.100	1.55	3,890	.0360
NEJWO	...	350,000	.360	.100	1.61	4,270	.0308
NEJZY	...	400,000	.360	.100	1.65	4,550	.0270
NEKAT	...	500,000	.360	.110	1.76	5,280	.0216
NEKEV	...	600,000	.360	.110	1.84	5,790	.0180
NEKOY	...	750,000	.360	.110	1.94	6,540	.0144
NEKTA	...	1,000,000	.360	.115	2.11	8,000	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



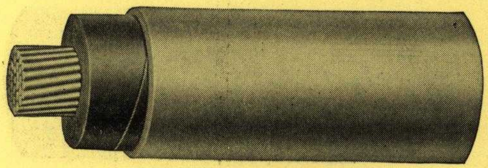
SINGLE CONDUCTOR — 26,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NAMSE	2	66,370	.295	.085	1.06	1,870	.162
NAMVO	1	83,690	.295	.095	1.12	2,130	.129
NAMYX	1/0	105,500	.295	.095	1.16	2,290	.102
NANAS	2/0	133,100	.295	.095	1.20	2,480	.0811
NANET	3/0	167,800	.295	.095	1.25	2,690	.0642
NANIV	4/0	211,600	.295	.095	1.31	2,960	.0509
NANSA	...	250,000	.295	.095	1.36	3,170	.0431
NANTE	...	300,000	.295	.100	1.42	3,620	.0360
NANUX	...	350,000	.295	.100	1.48	3,890	.0308
NANZY	...	400,000	.295	.100	1.52	4,160	.0270
NAOKS	...	500,000	.295	.100	1.61	4,660	.0216
NAOLT	...	600,000	.295	.100	1.69	5,150	.0180
NAOPY	...	750,000	.295	.110	1.82	6,090	.0144
NAORB	...	1,000,000	.295	.110	1.98	7,240	.0108

SINGLE CONDUCTOR — 26,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEKUZ	2	66,370	.375	.095	1.24	2,390	.162
NEKVE	1	83,690	.375	.095	1.28	2,530	.129
NEKVO	1/0	105,500	.375	.095	1.33	2,700	.102
NELAV	2/0	133,100	.375	.095	1.36	2,890	.0811
NELCY	3/0	167,800	.375	.100	1.42	3,280	.0642
NELIX	4/0	211,600	.375	.100	1.48	3,560	.0509
NELOZ	...	250,000	.375	.100	1.53	3,790	.0431
NELUB	...	300,000	.375	.100	1.58	4,090	.0360
NELVA	...	350,000	.375	.100	1.64	4,370	.0308
NELWE	...	400,000	.375	.100	1.68	4,640	.0270
NELZO	...	500,000	.375	.110	1.79	5,370	.0216
NEMBO	...	600,000	.375	.110	1.87	5,900	.0180
NEMIZ	...	750,000	.375	.110	1.97	6,640	.0144
NEMOB	...	1,000,000	.375	.115	2.14	8,070	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



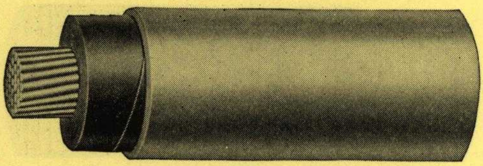
SINGLE CONDUCTOR — 27,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NAMSE	2	66,370	.295	.085	1.06	1,870	.162
NAMVO	1	83,690	.295	.095	1.12	2,130	.129
NAMYX	1/0	105,500	.295	.095	1.16	2,290	.102
NANAS	2/0	133,100	.295	.095	1.20	2,480	.0811
NANET	3/0	167,800	.295	.095	1.25	2,690	.0642
NANIV	4/0	211,600	.295	.095	1.31	2,960	.0509
NANSA	...	250,000	.295	.095	1.36	3,170	.0431
NANTE	...	300,000	.295	.100	1.42	3,620	.0360
NANUX	...	350,000	.295	.100	1.48	3,890	.0308
NANZY	...	400,000	.295	.100	1.52	4,160	.0270
NAOKS	...	500,000	.295	.100	1.61	4,660	.0216
NAOLT	...	600,000	.295	.100	1.69	5,150	.0180
NAOPY	...	750,000	.295	.110	1.82	6,090	.0144
NAORB	...	1,000,000	.295	.110	1.98	7,240	.0108

SINGLE CONDUCTOR — 27,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEMUC	2	66,370	.390	.095	1.27	2,460	.162
NEMWA	1	83,690	.390	.095	1.31	2,590	.129
NEMYE	1/0	105,500	.390	.095	1.35	2,780	.102
NENAY	2/0	133,100	.390	.095	1.39	2,970	.0811
NENCO	3/0	167,800	.390	.100	1.45	3,370	.0642
NENEZ	4/0	211,600	.390	.100	1.51	3,650	.0509
NENIB	...	250,000	.390	.100	1.56	3,890	.0431
NENOC	...	300,000	.390	.100	1.61	4,170	.0360
NENUD	...	350,000	.390	.100	1.67	4,460	.0308
NENYA	...	400,000	.390	.110	1.73	4,950	.0270
NENZE	...	500,000	.390	.110	1.82	5,480	.0216
NEOFS	...	600,000	.390	.110	1.90	6,000	.0180
NEOGT	...	750,000	.390	.110	2.00	6,750	.0144
NEOHV	...	1,000,000	.390	.115	2.17	8,180	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **28,000 VOLTS**

(Grounded Neutral)

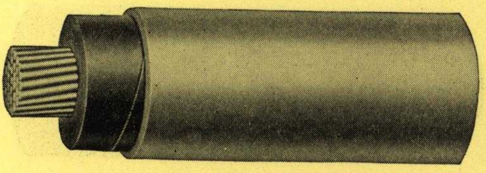
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NAOSC	1	83,690	.315	.095	1.16	2,230	.129
NAOWG	1/0	105,500	.315	.095	1.20	2,390	.102
NAPAT	2/0	133,100	.315	.095	1.24	2,580	.0811
NAPEV	3/0	167,800	.315	.095	1.29	2,780	.0642
NAPOY	4/0	211,600	.315	.095	1.35	3,060	.0509
NAPTA	...	250,000	.315	.100	1.41	3,450	.0431
NAPUZ	...	300,000	.315	.100	1.46	3,730	.0360
NAPVE	...	350,000	.315	.100	1.52	4,010	.0308
NAPYO	...	400,000	.315	.100	1.56	4,270	.0270
NARBO	...	500,000	.315	.100	1.65	4,780	.0216
NARIZ	...	600,000	.315	.110	1.75	5,490	.0180
NAROB	...	750,000	.315	.110	1.85	6,230	.0144
NARUC	...	1,000,000	.315	.110	2.01	7,380	.0108

SINGLE CONDUCTOR **28,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEOKY	1	83,690	.405	.095	1.34	2,680	.129
NEOLZ	1/0	105,500	.405	.095	1.38	2,850	.102
NEONC	2/0	133,100	.405	.100	1.43	3,220	.0811
NEORG	3/0	167,800	.405	.100	1.48	3,450	.0642
NEOSH	4/0	211,600	.405	.100	1.54	3,740	.0509
NEOVK	...	250,000	.405	.100	1.59	3,970	.0431
NEOWL	...	300,000	.405	.100	1.64	4,250	.0360
NEOZN	...	350,000	.405	.100	1.70	4,550	.0308
NEPAZ	...	400,000	.405	.110	1.76	5,040	.0270
NEPBE	...	500,000	.405	.110	1.85	5,570	.0216
NEPEB	...	600,000	.405	.110	1.93	6,100	.0180
NEPGY	...	750,000	.405	.115	2.04	7,100	.0144
NEPIC	...	1,000,000	.405	.115	2.20	8,390	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



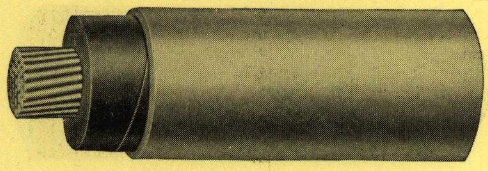
SINGLE CONDUCTOR — 29,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NARWA	1	83,690	.330	.095	1.19	2,300	.129
NARYE	1/0	105,500	.330	.095	1.23	2,470	.102
NASAY	2/0	133,100	.330	.095	1.27	2,660	.0811
NASCO	3/0	167,800	.330	.095	1.32	2,870	.0642
NASEZ	4/0	211,600	.33C	.095	1.38	3,140	.0509
NASIB	...	250,000	.330	.100	1.44	3,540	.0431
NASOC	...	300,000	.330	.100	1.49	3,820	.0360
NASUD	...	350,000	.330	.100	1.55	4,090	.0308
NASYA	...	400,000	.330	.100	1.59	4,370	.0270
NASZE	...	500,000	.330	.100	1.68	4,880	.0216
NATAZ	...	600,000	.330	.110	1.78	5,590	.0180
NATDO	...	750,000	.330	.110	1.88	6,330	.0144
NATEB	...	1,000,000	.330	.115	2.08	7,740	.0108

SINGLE CONDUCTOR — 29,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEPOD	1	83,690	.420	.095	1.37	2,760	.129
NEPUF	1/0	105,500	.420	.100	1.42	3,110	.102
NEPYG	2/0	133,100	.420	.100	1.46	3,300	.0811
NEPZA	3/0	167,800	.420	.100	1.51	3,540	.0642
NERCA	4/0	211,600	.420	.100	1.57	3,830	.0509
NERDE	...	250,000	.420	.100	1.62	4,080	.0431
NERED	...	300,000	.420	.100	1.67	4,340	.0360
NERGO	...	350,000	.420	.110	1.75	4,840	.0308
NERIF	...	400,000	.420	.110	1.79	5,140	.0270
NEROG	...	500,000	.420	.110	1.88	5,680	.0216
NERUH	...	600,000	.420	.110	1.96	6,210	.0180
NERYJ	...	750,000	.420	.115	2.07	7,210	.0144
NESAD	...	1,000,000	.420	.115	2.23	8,410	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



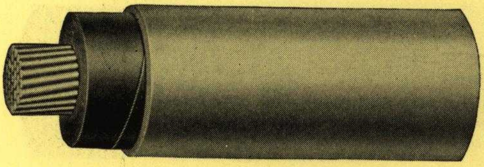
SINGLE CONDUCTOR — 30,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NARWA	1	83,690	.330	.095	1.19	2,300	.129
NARYE	1/0	105,500	.330	.095	1.23	2,470	.102
NASAY	2/0	133,100	.330	.095	1.27	2,660	.0811
NASCO	3/0	167,800	.330	.095	1.32	2,870	.0642
NASEZ	4/0	211,600	.330	.095	1.38	3,140	.0509
NASIB	...	250,000	.330	.100	1.44	3,540	.0431
NASOC	...	300,000	.330	.100	1.49	3,820	.0360
NASUD	...	350,000	.330	.100	1.55	4,090	.0308
NASYA	...	400,000	.330	.100	1.59	4,370	.0270
NASZE	...	500,000	.330	.100	1.68	4,880	.0216
NATAZ	...	600,000	.330	.110	1.78	5,590	.0180
NATDO	...	750,000	.330	.110	1.88	6,330	.0144
NATEB	...	1,000,000	.330	.115	2.08	7,740	.0108

SINGLE CONDUCTOR — 30,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEPOD	1	83,690	.420	.095	1.37	2,760	.129
NEPUF	1/0	105,500	.420	.100	1.42	3,110	.102
NEPYG	2/0	133,100	.420	.100	1.46	3,300	.0811
NEPZA	3/0	167,800	.420	.100	1.51	3,540	.0642
NERCA	4/0	211,600	.420	.100	1.57	3,830	.0509
NERDE	...	250,000	.420	.100	1.62	4,080	.0431
NERED	...	300,000	.420	.100	1.67	4,340	.0360
NERGO	...	350,000	.420	.110	1.75	4,840	.0308
NERIF	...	400,000	.420	.110	1.79	5,140	.0270
NEROG	...	500,000	.420	.110	1.88	5,680	.0216
NERUH	...	600,000	.420	.110	1.96	6,210	.0180
NERYJ	...	750,000	.420	.115	2.07	7,210	.0144
NESAD	...	1,000,000	.420	.115	2.23	8,410	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **31,000 VOLTS**

(Grounded Neutral)

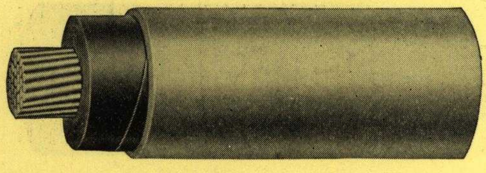
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NATGY	1/0	105,500	.345	.095	1.26	2,550	.102
NATIC	2/0	133,100	.345	.095	1.30	2,730	.0811
NATOD	3/0	167,800	.345	.095	1.35	2,950	.0642
NATUF	4/0	211,600	.345	.100	1.42	3,390	.0509
NATYG	...	250,000	.345	.100	1.47	3,620	.0431
NATZA	...	300,000	.345	.100	1.52	3,910	.0360
NAUHR	...	350,000	.345	.100	1.58	4,190	.0308
NAUJS	...	400,000	.345	.100	1.62	4,460	.0270
NAUKT	...	500,000	.345	.110	1.73	5,180	.0216
NAULV	...	600,000	.345	.110	1.81	5,690	.0180
NAUPZ	...	750,000	.345	.110	1.91	6,430	.0144
NAURC	...	1,000,000	.345	.115	2.08	7,850	.0108

SINGLE CONDUCTOR **31,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NESDA	1/0	105,500	.440	.100	1.46	3,220	.102
NESEF	2/0	133,100	.440	.100	1.50	3,420	.0811
NESFE	3/0	167,800	.440	.100	1.55	3,660	.0642
NESHO	4/0	211,600	.440	.100	1.61	3,950	.0509
NESIG	...	250,000	.440	.100	1.66	4,170	.0431
NESOH	...	300,000	.440	.110	1.73	4,680	.0360
NESUJ	...	350,000	.440	.110	1.79	4,990	.0308
NESYK	...	400,000	.440	.110	1.83	5,280	.0270
NETAF	...	500,000	.440	.110	1.92	5,810	.0216
NETEG	...	600,000	.440	.110	2.00	6,340	.0180
NETGE	...	750,000	.440	.115	2.11	7,350	.0144
NETJO	...	1,000,000	.440	.115	2.27	8,560	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



SINGLE CONDUCTOR **32,000 VOLTS**

(Grounded Neutral)

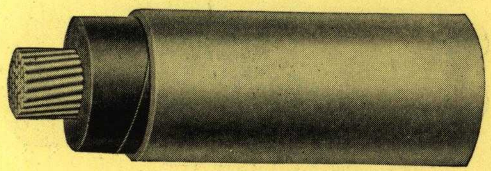
Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NATGY	1/0	105,500	.345	.095	1.26	2,550	.102
NATIC	2/0	133,100	.345	.095	1.30	2,730	.0811
NATOD	3/0	167,800	.345	.095	1.35	2,950	.0642
NATUF	4/0	211,600	.345	.100	1.42	3,390	.0509
NATYG	...	250,000	.345	.100	1.47	3,620	.0431
NATZA	...	300,000	.345	.100	1.52	3,910	.0360
NAUHR	...	350,000	.345	.100	1.58	4,190	.0308
NAUJS	...	400,000	.345	.100	1.62	4,460	.0270
NAUKT	...	500,000	.345	.110	1.73	5,180	.0216
NAULV	...	600,000	.345	.110	1.81	5,690	.0180
NAUPZ	...	750,000	.345	.110	1.91	6,430	.0144
NAURC	...	1,000,000	.345	.115	2.08	7,850	.0108

SINGLE CONDUCTOR **32,000 VOLTS**

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NESDA	1/0	105,500	.440	.100	1.46	3,220	.102
NESEF	2/0	133,100	.440	.100	1.50	3,420	.0811
NESFE	3/0	167,800	.440	.100	1.55	3,660	.0642
NESHO	4/0	211,600	.440	.100	1.61	3,950	.0509
NESIG	...	250,000	.440	.100	1.66	4,170	.0431
NESOH	...	300,000	.440	.110	1.73	4,680	.0360
NESUJ	...	350,000	.440	.110	1.79	4,990	.0308
NESYK	...	400,000	.440	.110	1.83	5,280	.0270
NETAF	...	500,000	.440	.110	1.92	5,810	.0216
NETEG	...	600,000	.440	.110	2.00	6,340	.0180
NETGE	...	750,000	.440	.115	2.11	7,350	.0144
NETJO	...	1,000,000	.440	.115	2.27	8,560	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



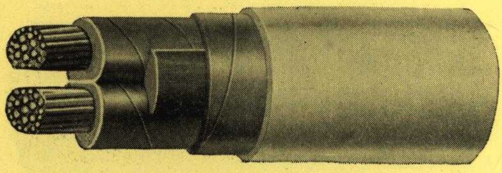
SINGLE CONDUCTOR — 33,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NAUSD	1/0	105,500	.360	.095	1.29	2,620	.102
NAUVG	2/0	133,100	.360	.095	1.33	2,810	.0811
NAUZK	3/0	167,800	.360	.095	1.38	3,030	.0642
NAVAB	4/0	211,600	.360	.100	1.45	3,380	.0509
NAVBA	...	250,000	.360	.100	1.50	3,700	.0431
NAVCE	...	300,000	.360	.100	1.55	3,890	.0360
NAVEC	...	350,000	.360	.100	1.61	4,270	.0308
NAVFO	...	400,000	.360	.100	1.65	4,550	.0270
NAVHY	...	500,000	.360	.110	1.76	5,280	.0216
NAVID	...	600,000	.360	.110	1.84	5,790	.0180
NAVOF	...	750,000	.360	.110	1.94	6,540	.0144
NAVUG	...	1,000,000	.360	.115	2.11	8,000	.0108

SINGLE CONDUCTOR — 33,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NETOJ	1/0	105,500	.455	.100	1.49	3,310	.102
NETUK	2/0	133,100	.455	.100	1.53	3,510	.0811
NETYL	3/0	167,800	.455	.100	1.58	3,750	.0642
NEVAG	4/0	211,600	.455	.100	1.64	4,040	.0509
NEVGA	...	250,000	.455	.100	1.69	4,280	.0431
NEVHE	...	300,000	.455	.110	1.76	4,770	.0360
NEVIJ	...	350,000	.455	.110	1.82	5,080	.0308
NEVKO	...	400,000	.455	.110	1.86	5,380	.0270
NEVOK	...	500,000	.455	.110	1.95	5,920	.0216
NEVUL	...	600,000	.455	.115	2.04	6,700	.0180
NEWAH	...	750,000	.455	.115	2.14	7,460	.0144
NEWHA	...	1,000,000	.455	.115	2.30	8,670	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



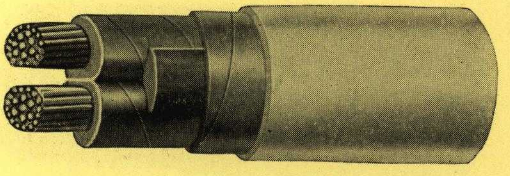
TWO CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) — 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LEVAP	8	16,510	Sector	.065	.030	.080	.69	940	.654
LEVIR	6	26,250	Sector	.065	.030	.080	.74	1,080	.410
LEVOS	4	41,740	Sector	.065	.030	.085	.82	1,390	.259
LEVPA	2	66,370	Sector	.065	.030	.085	.91	1,680	.162
LEVSO	1	83,690	Sector	.065	.030	.085	.96	1,870	.129
LEVUT	1/0	105,500	Sector	.065	.030	.085	1.02	2,110	.102
LEVYV	2/0	133,100	Sector	.065	.030	.095	1.11	2,530	.0811
LEWER	3/0	167,800	Sector	.065	.030	.095	1.18	2,870	.0642
LEWRE	4/0	211,600	Sector	.065	.030	.095	1.26	3,290	.0509
LEWTO	...	250,000	Sector	.080	.030	.095	1.39	3,800	.0431
LEWUV	...	300,000	Sector	.080	.030	.100	1.48	4,440	.0360
LEYAR	...	350,000	Sector	.080	.030	.100	1.55	4,900	.0308
LEYIT	...	400,000	Sector	.080	.030	.100	1.62	5,380	.0270
LEYOV	...	500,000	Sector	.080	.030	.110	1.76	6,460	.0216
LEYRA	...	600,000	Sector	.080	.030	.110	1.87	7,340	.0180
LEYSE	...	750,000	Sector	.080	.030	.110	2.02	8,640	.0144
LEYVO	...	1,000,000	Sector	.080	.045	.115	2.28	11,020	.0108

TWO CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) — 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LEZAS	8	16,510	Sector	.080	.030	.080	.75	1,040	.654
LEZET	6	26,250	Sector	.080	.030	.085	.81	1,280	.410
LEZIV	4	41,740	Sector	.080	.030	.085	.88	1,500	.259
LEZSA	2	66,370	Sector	.080	.030	.085	.97	1,800	.162
LEZTE	1	83,690	Sector	.080	.030	.085	1.02	1,990	.129
LEZUX	1/0	105,500	Sector	.080	.030	.095	1.10	2,370	.102
LEZWO	2/0	133,100	Sector	.080	.030	.095	1.17	2,660	.0811
LIABZ	3/0	167,800	Sector	.080	.030	.095	1.24	3,010	.0642
LIAFD	4/0	211,600	Sector	.080	.030	.095	1.32	3,430	.0509
LIAHG	...	250,000	Sector	.080	.045	.100	1.43	4,050	.0431
LIALK	...	300,000	Sector	.080	.045	.100	1.51	4,520	.0360
LIATS	...	350,000	Sector	.080	.045	.100	1.58	4,990	.0308
LIAVT	...	400,000	Sector	.080	.045	.100	1.65	5,470	.0270
LIAZY	...	500,000	Sector	.080	.045	.110	1.79	6,560	.0216
LIBAZ	...	600,000	Sector	.080	.045	.110	1.90	7,440	.0180
LIBBE	...	750,000	Sector	.080	.045	.115	2.06	9,000	.0144
LIBDO	...	1,000,000	Sector	.080	.045	.115	2.28	11,060	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



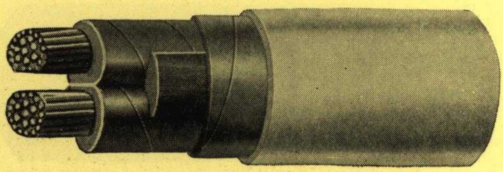
TWO CONDUCTOR—BELTED 3,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIBEB	8	16,510	Sector	.080	.045	.085	.79	1,190	.654
LIBGY	6	26,250	Sector	.080	.045	.085	.84	1,340	.410
LIBIC	4	41,740	Sector	.080	.045	.085	.91	1,560	.259
LIBOD	2	66,370	Sector	.080	.045	.085	1.00	1,860	.162
LIBUF	1	83,690	Sector	.080	.045	.085	1.05	2,060	.129
LIBYG	1/0	105,500	Sector	.080	.045	.095	1.13	2,440	.102
LIBZA	2/0	133,100	Sector	.080	.045	.095	1.20	2,740	.0811
LICAB	3/0	167,800	Sector	.080	.045	.095	1.27	3,080	.0642
LICBA	4/0	211,600	Sector	.080	.045	.095	1.35	3,510	.0509
LICCE	...	250,000	Sector	.080	.045	.100	1.43	4,050	.0431
LICFO	...	300,000	Sector	.080	.045	.100	1.51	4,520	.0360
LICHY	...	350,000	Sector	.080	.045	.100	1.58	4,990	.0308
LICID	...	400,000	Sector	.080	.045	.100	1.65	5,470	.0270
LICOF	...	500,000	Sector	.080	.045	.110	1.79	6,560	.0216
LICUG	...	600,000	Sector	.080	.045	.110	1.90	7,440	.0180
LICYH	...	750,000	Sector	.080	.045	.115	2.06	9,000	.0144
LIDAC	...	1,000,000	Sector	.080	.045	.115	2.28	11,060	.0108

TWO CONDUCTOR—BELTED 4,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIDCA	8	16,510	Sector	.095	.045	.085	.85	1,330	.654
LIDDE	6	26,250	Sector	.095	.045	.085	.90	1,450	.410
LIDED	4	41,740	Sector	.095	.045	.085	.97	1,670	.259
LIBGO	2	66,370	Sector	.095	.045	.085	1.06	1,980	.162
LIDIF	1	83,690	Sector	.095	.045	.095	1.13	2,320	.129
LIDJY	1/0	105,500	Sector	.095	.045	.095	1.19	2,570	.102
LIDOG	2/0	133,100	Sector	.095	.045	.095	1.26	2,870	.0811
LIDUH	3/0	167,800	Sector	.095	.045	.095	1.33	3,220	.0642
LIDYJ	4/0	211,600	Sector	.095	.045	.100	1.42	3,820	.0509
LIEXY	...	250,000	Sector	.095	.045	.100	1.49	4,200	.0431
LIFAD	...	300,000	Sector	.095	.045	.100	1.57	4,700	.0360
LIFDA	...	350,000	Sector	.095	.045	.100	1.64	5,170	.0308
LIFEF	...	400,000	Sector	.095	.045	.110	1.73	5,860	.0270
LIFFE	...	500,000	Sector	.095	.045	.110	1.85	6,750	.0216
LIFHO	...	600,000	Sector	.095	.045	.110	1.96	7,640	.0180
LIFIG	...	750,000	Sector	.095	.045	.115	2.12	9,190	.0144
LIFKY	...	1,000,000	Sector	.095	.045	.125	2.36	11,600	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



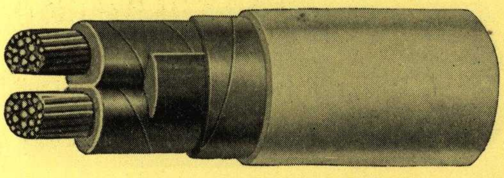
TWO CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LIFOH	8	16,510	Sector	.095	.065	.085	.89	1,390	.654
LIFUJ	6	26,250	Sector	.095	.065	.085	.94	1,540	.410
LIFYK	4	41,740	Sector	.095	.065	.085	1.01	1,760	.259
LIGAF	2	66,370	Sector	.095	.065	.095	1.12	2,210	.162
LIGEG	1	83,690	Sector	.095	.065	.095	1.17	2,410	.129
LIGFA	1/0	105,500	Sector	.095	.065	.095	1.23	2,670	.102
LIGGE	2/0	133,100	Sector	.095	.065	.095	1.29	2,970	.0811
LIGJO	3/0	167,800	Sector	.095	.065	.095	1.37	3,330	.0642
LIGOJ	4/0	211,600	Sector	.095	.065	.100	1.46	3,930	.0509
LIGUK	...	250,000	Sector	.095	.065	.100	1.53	4,320	.0431
LIGYL	...	300,000	Sector	.095	.065	.100	1.61	4,820	.0360
LIHAG	...	350,000	Sector	.095	.065	.100	1.68	5,300	.0308
LIHGA	...	400,000	Sector	.095	.065	.110	1.76	6,040	.0270
LIHHE	...	500,000	Sector	.095	.065	.110	1.88	6,880	.0216
LIHIJ	...	600,000	Sector	.095	.065	.110	2.00	7,780	.0180
LIHKO	...	750,000	Sector	.095	.065	.115	2.16	9,340	.0144
LIHMY	...	1,000,000	Sector	.095	.065	.125	2.40	11,770	.0108

TWO CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 6,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LIHOK	8	16,510	Round	.095	.065	.085	.97	1,580	.654
LIHUL	6	26,250	Round	.095	.065	.085	1.05	1,790	.410
LIJAH	4	41,740	Round	.095	.065	.095	1.16	2,230	.259
LIJHA	2	66,370	Sector	.095	.065	.095	1.12	2,210	.162
LIJIK	1	83,690	Sector	.095	.065	.095	1.17	2,410	.129
LIJJE	1/0	105,500	Sector	.095	.065	.095	1.23	2,670	.102
LIJLO	2/0	133,100	Sector	.095	.065	.095	1.29	2,970	.0811
LIJNY	3/0	167,800	Sector	.095	.065	.095	1.37	3,330	.0642
LIJOL	4/0	211,600	Sector	.095	.065	.100	1.46	3,930	.0509
LIJUM	...	250,000	Sector	.095	.065	.100	1.53	4,320	.0431
LIJYN	...	300,000	Sector	.095	.065	.100	1.61	4,820	.0360
LIKAJ	...	350,000	Sector	.095	.065	.100	1.68	5,300	.0308
LIKEK	...	400,000	Sector	.095	.065	.110	1.76	6,040	.0270
LIKIL	...	500,000	Sector	.095	.065	.110	1.88	6,880	.0216
LIKJA	...	600,000	Sector	.095	.065	.110	2.00	7,780	.0180
LIKKE	...	750,000	Sector	.095	.065	.115	2.16	9,340	.0144
LIKMO	...	1,000,000	Sector	.095	.065	.125	2.40	11,770	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



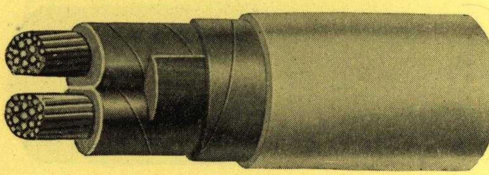
TWO CONDUCTOR—BELTED (Grounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIKYP	8	16,510	Round	.110	.065	.085	1.03	1,710	.654
LILAK	6	26,250	Round	.110	.065	.095	1.13	2,060	.410
LILEL	4	41,740	Round	.110	.065	.095	1.23	2,340	.259
LILKA	2	66,370	Sector	.110	.065	.095	1.18	2,340	.162
LILNO	1	83,690	Sector	.110	.065	.095	1.23	2,550	.129
LILON	1/0	105,500	Sector	.110	.065	.095	1.29	2,810	.102
LILUP	2/0	133,100	Sector	.110	.065	.095	1.36	3,120	.0811
LIMAL	3/0	167,800	Sector	.110	.065	.100	1.44	3,640	.0642
LIMEM	4/0	211,600	Sector	.110	.065	.100	1.52	4,080	.0509
LIMLA	...	250,000	Sector	.110	.065	.100	1.59	4,500	.0431
LIMME	...	300,000	Sector	.110	.065	.100	1.67	4,990	.0360
LIMOP	...	350,000	Sector	.110	.065	.110	1.76	5,680	.0308
LIMPO	...	400,000	Sector	.110	.065	.110	1.83	6,170	.0270
LIMRY	...	500,000	Sector	.110	.065	.110	1.95	7,070	.0216
LIMYR	...	600,000	Sector	.110	.065	.115	2.07	8,230	.0180
LINAM	...	750,000	Sector	.110	.065	.115	2.22	9,550	.0144
LINIP	...	1,000,000	Sector	.110	.065	.125	2.46	12,000	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIZCO	8	16,510	Round	.110	.095	.095	1.11	1,970	.654
LIZEZ	6	26,250	Round	.110	.095	.095	1.19	2,210	.410
LIZIB	4	41,740	Round	.110	.095	.095	1.39	2,670	.259
LIZOC	2	66,370	Sector	.110	.095	.095	1.24	2,490	.162
LIZUD	1	83,690	Sector	.110	.095	.095	1.29	2,700	.129
LIZYA	1/0	105,500	Sector	.110	.095	.095	1.35	2,960	.102
LIZZE	2/0	133,100	Sector	.110	.095	.100	1.43	3,440	.0811
LOAHL	3/0	167,800	Sector	.110	.095	.100	1.50	3,820	.0642
LOAJM	4/0	211,600	Sector	.110	.095	.100	1.58	4,270	.0509
LOALP	...	250,000	Sector	.110	.095	.100	1.65	4,680	.0431
LOAPS	...	300,000	Sector	.110	.095	.110	1.75	5,390	.0360
LOARV	...	350,000	Sector	.110	.095	.110	1.82	5,880	.0308
LOATY	...	400,000	Sector	.110	.095	.110	1.89	6,370	.0270
LOAVZ	...	500,000	Sector	.110	.095	.110	2.01	7,290	.0216
LOAWB	...	600,000	Sector	.110	.095	.115	2.13	8,440	.0180
LOAZD	...	750,000	Sector	.110	.095	.115	2.28	9,770	.0144
LOBAF	...	1,000,000	Sector	.110	.095	.125	2.52	12,250	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



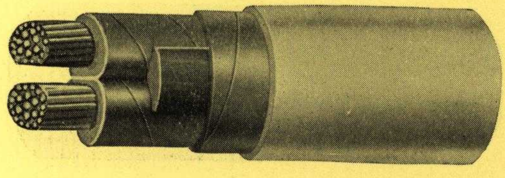
TWO CONDUCTOR—BELTED (Grounded Neutral) 8,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LILAK	6	26,250	Round	.110	.065	.095	1.13	2,060	.410
LILEL	4	41,740	Round	.110	.065	.095	1.23	2,340	.259
LILKA	2	66,370	Sector	.110	.065	.095	1.18	2,340	.162
LILNO	1	83,690	Sector	.110	.065	.095	1.23	2,550	.129
LILON	1/0	105,500	Sector	.110	.065	.095	1.29	2,810	.102
LILUP	2/0	133,100	Sector	.110	.065	.095	1.36	3,120	.0811
LIMAL	3/0	167,800	Sector	.110	.065	.100	1.44	3,640	.0642
LIMEM	4/0	211,600	Sector	.110	.065	.100	1.52	4,080	.0509
LIMLA	...	250,000	Sector	.110	.065	.100	1.59	4,500	.0431
LIMME	...	300,000	Sector	.110	.065	.100	1.67	4,990	.0360
LIMOP	...	350,000	Sector	.110	.065	.110	1.76	5,680	.0308
LIMPO	...	400,000	Sector	.110	.065	.110	1.83	6,170	.0270
LIMRY	...	500,000	Sector	.110	.065	.110	1.95	7,070	.0216
LIMYR	...	600,000	Sector	.110	.065	.115	2.07	8,230	.0180
LINAM	...	750,000	Sector	.110	.065	.115	2.22	9,550	.0144
LINIP	...	1,000,000	Sector	.110	.065	.125	2.46	12,000	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 8,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOBEG	6	26,250	Round	.110	.110	.095	1.22	2,280	.410
LOBFA	4	41,740	Round	.110	.110	.095	1.32	2,600	.259
LOBGE	2	66,370	Sector	.110	.110	.095	1.27	2,560	.162
LOBJO	1	83,690	Sector	.110	.110	.095	1.32	2,780	.129
LOBLY	1/0	105,500	Sector	.110	.110	.095	1.38	3,040	.102
LOBOJ	2/0	133,100	Sector	.110	.110	.100	1.46	3,530	.0811
LOBUK	3/0	167,800	Sector	.110	.110	.100	1.53	3,910	.0642
LOBYL	4/0	211,600	Sector	.110	.110	.100	1.61	4,360	.0509
LOCAG	...	250,000	Sector	.110	.110	.100	1.68	4,770	.0431
LOCGA	...	300,000	Sector	.110	.110	.110	1.78	5,490	.0360
LOCHE	...	350,000	Sector	.110	.110	.110	1.85	5,980	.0308
LOCIJ	...	400,000	Sector	.110	.110	.110	1.92	6,470	.0270
LOCKO	...	500,000	Sector	.110	.110	.115	2.05	7,640	.0216
LOCOK	...	600,000	Sector	.110	.110	.115	2.16	8,550	.0180
LOCUL	...	750,000	Sector	.110	.110	.115	2.31	9,890	.0144
LODAH	...	1,000,000	Sector	.110	.110	.125	2.55	12,380	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



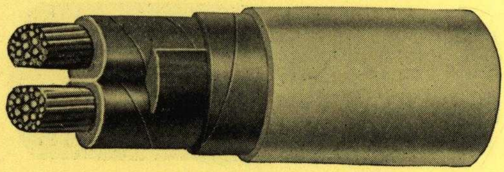
TWO CONDUCTOR—BELTED — 9,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LINMA	6	26,250	Round	.125	.065	.095	1.19	2,200	.410
LINNE	4	41,740	Round	.125	.065	.095	1.29	2,510	.259
LINSY	2	66,370	Sector	.125	.065	.095	1.24	2,470	.162
LINYS	1	83,690	Sector	.125	.065	.095	1.29	2,680	.129
LIOBD	1/0	105,500	Sector	.125	.065	.095	1.35	2,940	.102
LIOCF	2/0	133,100	Sector	.125	.065	.100	1.43	3,430	.0811
LIOHK	3/0	167,800	Sector	.125	.065	.100	1.50	3,800	.0642
LIOJL	4/0	211,600	Sector	.125	.065	.100	1.58	4,260	.0509
LIOLN	...	250,000	Sector	.125	.065	.100	1.65	4,660	.0431
LIORT	...	300,000	Sector	.125	.065	.110	1.75	5,380	.0360
LIOVY	...	350,000	Sector	.125	.065	.110	1.82	5,860	.0308
LIOWZ	...	400,000	Sector	.125	.065	.110	1.89	6,340	.0270
LIPAN	...	500,000	Sector	.125	.065	.110	2.01	7,270	.0216
LIPEP	...	600,000	Sector	.125	.065	.115	2.13	8,430	.0180
LIPNA	...	750,000	Sector	.125	.065	.115	2.28	9,750	.0144
LIPRO	...	1,000,000	Sector	.125	.065	.125	2.52	12,240	.0108

TWO CONDUCTOR—BELTED — 9,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LODHA	6	26,250	Round	.125	.125	.095	1.31	2,510	.410
LODIK	4	41,740	Round	.125	.125	.100	1.42	3,000	.259
LODJE	2	66,370	Sector	.125	.125	.095	1.36	2,780	.162
LODLO	1	83,690	Sector	.125	.125	.100	1.42	3,170	.129
LODNY	1/0	105,500	Sector	.125	.125	.100	1.48	3,450	.102
LODOL	2/0	133,100	Sector	.125	.125	.100	1.55	3,770	.0811
LODUM	3/0	167,800	Sector	.125	.125	.100	1.62	4,150	.0642
LODYN	4/0	211,600	Sector	.125	.125	.100	1.70	4,630	.0509
LOECH	...	250,000	Sector	.125	.125	.110	1.79	5,260	.0431
LOEFK	...	300,000	Sector	.125	.125	.110	1.87	5,780	.0360
LOEJN	...	350,000	Sector	.125	.125	.110	1.94	6,270	.0308
LOENS	...	400,000	Sector	.125	.125	.110	2.01	6,780	.0270
LOEPT	...	500,000	Sector	.125	.125	.115	2.14	7,950	.0216
LOETZ	...	600,000	Sector	.125	.125	.115	2.25	8,870	.0180
LOEVB	...	750,000	Sector	.125	.125	.125	2.42	10,550	.0144
LOEXD	...	1,000,000	Sector	.125	.125	.125	2.64	12,760	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



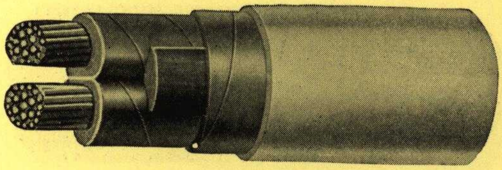
TWO CONDUCTOR—BELTED (Grounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LINMA	6	26,250	Round	.125	.065	.095	1.19	2,200	.410
LINNE	4	41,740	Round	.125	.065	.095	1.29	2,510	.259
LINSY	2	66,370	Sector	.125	.065	.095	1.24	2,470	.162
LINYS	1	83,690	Sector	.125	.065	.095	1.29	2,680	.129
LIOBD	1/0	105,500	Sector	.125	.065	.095	1.35	2,940	.102
LIOCF	2/0	133,100	Sector	.125	.065	.100	1.43	3,430	.0811
LIOHK	3/0	167,800	Sector	.125	.065	.100	1.50	3,800	.0642
LIOJL	4/0	211,600	Sector	.125	.065	.100	1.58	4,260	.0509
LIOLN	...	250,000	Sector	.125	.065	.100	1.65	4,660	.0431
LIORT	...	300,000	Sector	.125	.065	.110	1.75	5,380	.0360
LIOVY	...	350,000	Sector	.125	.065	.110	1.82	5,860	.0308
LIOWZ	...	400,000	Sector	.125	.065	.110	1.89	6,340	.0270
LIPAN	...	500,000	Sector	.125	.065	.110	2.01	7,270	.0216
LIPEP	...	600,000	Sector	.125	.065	.115	2.13	8,430	.0180
LIPNA	...	750,000	Sector	.125	.065	.115	2.28	9,750	.0144
LIPRO	...	1,000,000	Sector	.125	.065	.125	2.52	12,240	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LODHA	6	26,250	Round	.125	.125	.095	1.31	2,510	.410
LODIK	4	41,740	Round	.125	.125	.100	1.42	3,000	.259
LODJE	2	66,370	Sector	.125	.125	.095	1.36	2,780	.162
LODLO	1	83,690	Sector	.125	.125	.100	1.42	3,170	.129
LODNY	1/0	105,500	Sector	.125	.125	.100	1.48	3,450	.102
LODOL	2/0	133,100	Sector	.125	.125	.100	1.55	3,770	.0811
LODUM	3/0	167,800	Sector	.125	.125	.100	1.62	4,150	.0642
LODYN	4/0	211,600	Sector	.125	.125	.100	1.70	4,630	.0509
LOECH	...	250,000	Sector	.125	.125	.110	1.79	5,260	.0431
LOEFK	...	300,000	Sector	.125	.125	.110	1.87	5,780	.0360
LOEJN	...	350,000	Sector	.125	.125	.110	1.94	6,270	.0308
LOENS	...	400,000	Sector	.125	.125	.110	2.01	6,780	.0270
LOEPT	...	500,000	Sector	.125	.125	.115	2.14	7,950	.0216
LOETZ	...	600,000	Sector	.125	.125	.115	2.25	8,870	.0180
LOEVB	...	750,000	Sector	.125	.125	.125	2.42	10,550	.0144
LOEXD	...	1,000,000	Sector	.125	.125	.125	2.64	12,760	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



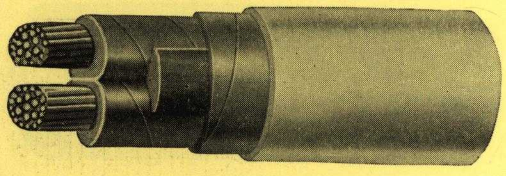
TWO CONDUCTOR—BELTED (Grounded Neutral) 11,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIPYT	6	26,250	Round	.125	.080	.095	1.22	2,280	.410
LIRER	4	41,740	Round	.125	.080	.095	1.32	2,600	.259
LIRRE	2	66,370	Sector	.125	.080	.095	1.27	2,550	.162
LIRTO	1	83,690	Sector	.125	.080	.095	1.32	2,760	.129
LIRUV	1/0	105,500	Sector	.125	.080	.095	1.38	3,020	.102
LIRWY	2/0	133,100	Sector	.125	.080	.100	1.46	3,510	.0811
LISAR	3/0	167,800	Sector	.125	.080	.100	1.53	3,880	.0642
LISIT	4/0	211,600	Sector	.125	.080	.100	1.61	4,350	.0509
LISOV	...	250,000	Sector	.125	.080	.100	1.68	4,760	.0431
LISRA	...	300,000	Sector	.125	.080	.110	1.78	5,480	.0360
LISVO	...	350,000	Sector	.125	.080	.110	1.85	5,970	.0308
LISYX	...	400,000	Sector	.125	.080	.110	1.92	6,460	.0270
LITAS	...	500,000	Sector	.125	.080	.115	2.05	7,620	.0216
LITET	...	600,000	Sector	.125	.080	.115	2.16	8,530	.0180
LITIV	...	750,000	Sector	.125	.080	.115	2.31	9,870	.0144
LITSA	...	1,000,000	Sector	.125	.080	.125	2.55	12,370	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 11,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LODHA	6	26,250	Round	.125	.125	.095	1.31	2,510	.410
LODIK	4	41,740	Round	.125	.125	.100	1.42	3,000	.259
LODJE	2	66,370	Sector	.125	.125	.095	1.36	2,780	.162
LODLO	1	83,690	Sector	.125	.125	.100	1.42	3,170	.129
LODNY	1/0	105,500	Sector	.125	.125	.100	1.48	3,450	.102
LODOL	2/0	133,100	Sector	.125	.125	.100	1.55	3,770	.0811
LODUM	3/0	167,800	Sector	.125	.125	.100	1.62	4,150	.0642
LODYN	4/0	211,600	Sector	.125	.125	.100	1.70	4,630	.0509
LOECH	...	250,000	Sector	.125	.125	.110	1.79	5,260	.0431
LOEFK	...	300,000	Sector	.125	.125	.110	1.87	5,780	.0360
LOEJN	...	350,000	Sector	.125	.125	.110	1.94	6,270	.0308
LOENS	...	400,000	Sector	.125	.125	.110	2.01	6,780	.0270
LOEPT	...	500,000	Sector	.125	.125	.115	2.14	7,950	.0216
LOETZ	...	600,000	Sector	.125	.125	.115	2.25	8,870	.0180
LOEVB	...	750,000	Sector	.125	.125	.125	2.42	10,550	.0144
LOEXD	...	1,000,000	Sector	.125	.125	.125	2.64	12,760	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



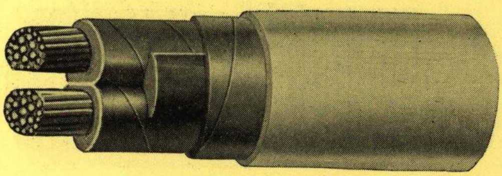
TWO CONDUCTOR—BELTED — 12,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LITUX	6	26,250	Round	.140	.080	.095	1.30	2,460	.410
LITWO	4	41,740	Round	.140	.080	.095	1.40	2,770	.259
LIUHL	2	66,370	Sector	.140	.080	.095	1.33	2,690	.162
LIUJM	1	83,690	Sector	.140	.080	.095	1.38	2,910	.129
LIULP	1/0	105,500	Sector	.140	.080	.100	1.45	3,340	.102
LIUPS	2/0	133,100	Sector	.140	.080	.100	1.52	3,670	.0811
LIURV	3/0	167,800	Sector	.140	.080	.100	1.59	4,060	.0642
LIUTY	4/0	211,600	Sector	.140	.080	.100	1.67	4,520	.0509
LIUVZ	...	250,000	Sector	.140	.080	.110	1.76	5,150	.0431
LIUZD	...	300,000	Sector	.140	.080	.110	1.84	5,660	.0360
LIVAT	...	350,000	Sector	.140	.080	.110	1.91	6,150	.0308
LIVEV	...	400,000	Sector	.140	.080	.110	1.98	6,650	.0270
LIVOY	...	500,000	Sector	.140	.080	.115	2.11	7,820	.0216
LIVTA	...	600,000	Sector	.140	.080	.115	2.22	8,740	.0180
LIVUZ	...	750,000	Sector	.140	.080	.125	2.39	10,410	.0144
LIVVE	...	1,000,000	Sector	.140	.080	.125	2.61	12,600	.0108

TWO CONDUCTOR—BELTED — 12,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOFAJ	6	26,250	Round	.140	.140	.100	1.41	2,810	.410
LOFEK	4	41,740	Round	.140	.140	.100	1.51	3,260	.259
LOFIL	2	66,370	Sector	.140	.140	.100	1.46	3,180	.162
LOFJA	1	83,690	Sector	.140	.140	.100	1.51	3,410	.129
LOFKE	1/0	105,500	Sector	.140	.140	.100	1.57	3,890	.102
LOFMO	2/0	133,100	Sector	.140	.140	.100	1.64	4,030	.0811
LOFYP	3/0	167,800	Sector	.140	.140	.110	1.73	4,630	.0642
LOGAK	4/0	211,600	Sector	.140	.140	.110	1.81	5,120	.0509
LOGEL	...	250,000	Sector	.140	.140	.110	1.88	5,550	.0431
LOGKA	...	300,000	Sector	.140	.140	.110	1.96	6,070	.0360
LOGLE	...	350,000	Sector	.140	.140	.115	2.04	6,820	.0308
LOGNO	...	400,000	Sector	.140	.140	.115	2.11	7,330	.0270
LOGON	...	500,000	Sector	.140	.140	.115	2.23	8,270	.0216
LOGUP	...	600,000	Sector	.140	.140	.125	2.36	9,520	.0180
LOHAL	...	750,000	Sector	.140	.140	.125	2.51	10,920	.0144
LOHEM	...	1,000,000	Sector	.140	.140	.135	2.75	13,470	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



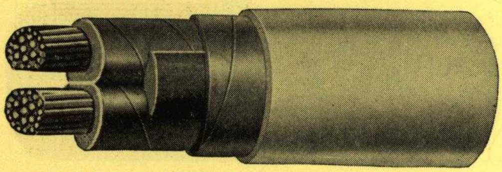
TWO CONDUCTOR—BELTED (Grounded Neutral) 13,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LITUX	6	26,250	Round	.140	.080	.095	1.30	2,460	.410
LITWO	4	41,740	Round	.140	.080	.095	1.40	2,770	.259
LIUHL	2	66,370	Sector	.140	.080	.095	1.33	2,690	.162
LIUJM	1	83,690	Sector	140	.080	.095	1.38	2,910	.129
LIULP	1/0	105,500	Sector	.140	.080	.100	1.45	3,340	.102
LIUPS	2/0	133,100	Sector	.140	.080	.100	1.52	3,670	.0811
LIURV	3/0	167,800	Sector	.140	.080	.100	1.59	4,060	.0642
LIUTY	4/0	211,600	Sector	.140	.080	.100	1.67	4,520	.0509
LIUVZ	...	250,000	Sector	.140	.080	.110	1.76	5,150	.0431
LIUZD	...	300,000	Sector	.140	.080	.110	1.84	5,660	.0360
LIVAT	...	350,000	Sector	.140	.080	.110	1.91	6,150	.0308
LIVEV	...	400,000	Sector	.140	.080	.110	1.98	6,650	.0270
LIVOY	...	500,000	Sector	.140	.080	.115	2.11	7,820	.0216
LIVTA	...	600,000	Sector	.140	.080	.115	2.22	8,740	.0180
LIVUZ	...	750,000	Sector	.140	.080	.125	2.39	10,410	.0144
LIVVE	...	1,000,000	Sector	.140	.080	.125	2.61	12,600	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 13,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOFAJ	6	26,250	Round	.140	.140	.100	1.41	2,810	.410
LOFEK	4	41,740	Round	.140	.140	.100	1.51	3,260	.259
LOFIL	2	66,370	Sector	.140	.140	.100	1.46	3,180	.162
LOFJA	1	83,690	Sector	.140	.140	.100	1.51	3,410	.129
LOFKE	1/0	105,500	Sector	.140	.140	.100	1.57	3,890	.102
LOFMO	2/0	133,100	Sector	.140	.140	.100	1.64	4,030	.0811
LOFYP	3/0	167,800	Sector	.140	.140	.110	1.73	4,630	.0642
LOGAK	4/0	211,600	Sector	.140	.140	.110	1.81	5,120	.0509
LOGEL	...	250,000	Sector	.140	.140	.110	1.88	5,550	.0431
LOGKA	...	300,000	Sector	.140	.140	.110	1.96	6,070	.0360
LOGLE	...	350,000	Sector	.140	.140	.115	2.04	6,820	.0308
LOGNO	...	400,000	Sector	.140	.140	.115	2.11	7,330	.0270
LOGON	...	500,000	Sector	.140	.140	.115	2.23	8,270	.0216
LOGUP	...	600,000	Sector	.140	.140	.125	2.36	9,520	.0180
LOHAL	...	750,000	Sector	.140	.140	.125	2.51	10,920	.0144
LOHEM	...	1,000,000	Sector	.140	.140	.135	2.75	13,470	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



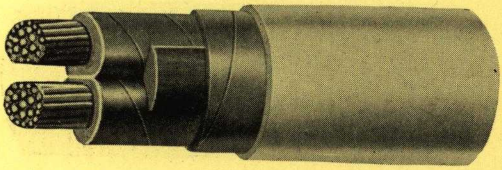
TWO CONDUCTOR—BELTED (Grounded Neutral) 14,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LIVYO	6	26,250	Round	.155	.080	.095	1.34	2,570	.410
LIWAV	4	41,740	Round	.155	.080	.100	1.45	3,080	.259
LIWIX	2	66,370	Sector	.155	.080	.095	1.39	2,830	.162
LIWOZ	1	83,690	Sector	.155	.080	.100	1.45	3,220	.129
LIWUB	1/0	105,500	Sector	.155	.080	.100	1.51	3,490	.102
LIYBO	2/0	133,100	Sector	.155	.080	.100	1.58	3,830	.0811
LIYFK	3/0	167,800	Sector	.155	.080	.100	1.65	4,230	.0642
LIYHM	4/0	211,600	Sector	.155	.080	.110	1.75	4,910	.0509
LIYIZ	...	250,000	Sector	.155	.080	.110	1.82	5,330	.0431
LIYJN	...	300,000	Sector	.155	.080	.110	1.90	5,840	.0360
LIYNS	...	350,000	Sector	.155	.080	.110	1.97	6,350	.0308
LIYOB	...	400,000	Sector	.155	.080	.115	2.05	7,100	.0270
LIYUC	...	500,000	Sector	.155	.080	.115	2.17	8,030	.0216
LIYWA	...	600,000	Sector	.155	.080	.115	2.28	8,950	.0180
LIYXD	...	750,000	Sector	.155	.080	.125	2.45	10,640	.0144
LIZAY	...	1,000,000	Sector	.155	.080	.135	2.69	13,160	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 14,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOHLA	6	26,250	Round	.155	.155	.100	1.50	3,160	.410
LOHME	4	41,740	Round	.155	.155	.100	1.60	3,490	.259
LOHOP	2	66,370	Sector	.155	.155	.100	1.55	3,420	.162
LOHPO	1	83,690	Sector	.155	.155	.100	1.60	3,630	.129
LOHYR	1/0	105,500	Sector	.155	.155	.100	1.66	3,950	.102
LOIGM	2/0	133,100	Sector	.155	.155	.110	1.75	4,500	.0811
LOIJP	3/0	167,800	Sector	.155	.155	.110	1.82	4,920	.0642
LOIRY	4/0	211,600	Sector	.155	.155	.110	1.90	5,410	.0509
LOJAM	...	250,000	Sector	.155	.155	.110	1.97	5,850	.0431
LOJEN	...	300,000	Sector	.155	.155	.115	2.06	6,630	.0360
LOJIP	...	350,000	Sector	.155	.155	.115	2.13	7,140	.0308
LOJMA	...	400,000	Sector	.155	.155	.115	2.20	7,650	.0270
LOJNE	...	500,000	Sector	.155	.155	.115	2.32	8,590	.0216
LOJUR	...	600,000	Sector	.155	.155	.125	2.45	9,880	.0180
LOJYS	...	750,000	Sector	.155	.155	.125	2.60	11,280	.0144
LOKAN	...	1,000,000	Sector	.155	.155	.135	2.84	13,860	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



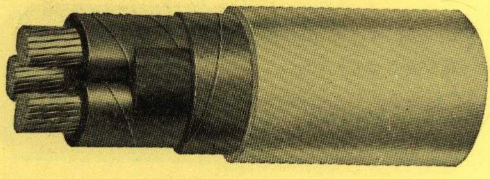
TWO CONDUCTOR—BELTED (Grounded Neutral) 15,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LIVYO	6	26,250	Round	.155	.080	.095	1.34	2,570	.410
LIWAV	4	41,740	Round	.155	.080	.100	1.45	3,080	.259
LIWIX	2	66,370	Sector	.155	.080	.095	1.39	2,830	.162
LIWOZ	1	83,690	Sector	.155	.080	.100	1.45	3,220	.129
LIWUB	1/0	105,500	Sector	.155	.080	.100	1.51	3,490	.102
LIYBO	2/0	133,100	Sector	.155	.080	.100	1.58	3,830	.0811
LIYFK	3/0	167,800	Sector	.155	.080	.100	1.65	4,230	.0642
LIYHM	4/0	211,600	Sector	.155	.080	.110	1.75	4,910	.0509
LIYIZ	...	250,000	Sector	.155	.080	.110	1.82	5,330	.0431
LIYJN	...	300,000	Sector	.155	.080	.110	1.90	5,840	.0360
LIYNS	...	350,000	Sector	.155	.080	.110	1.97	6,350	.0308
LIYOB	...	400,000	Sector	.155	.080	.115	2.05	7,100	.0270
LIYUC	...	500,000	Sector	.155	.080	.115	2.17	8,030	.0216
LIYWA	...	600,000	Sector	.155	.080	.115	2.28	8,950	.0180
LIYXD	...	750,000	Sector	.155	.080	.125	2.45	10,640	.0144
LIZAY	...	1,000,000	Sector	.155	.080	.135	2.69	13,160	.0108

TWO CONDUCTOR—BELTED (Ungrounded Neutral) 15,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOHLA	6	26,250	Round	.155	.155	.100	1.50	3,160	.410
LOHME	4	41,740	Round	.155	.155	.100	1.60	3,490	.259
LOHOP	2	66,370	Sector	.155	.155	.100	1.55	3,420	.162
LOHPO	1	83,690	Sector	.155	.155	.100	1.60	3,630	.129
LOHYR	1/0	105,500	Sector	.155	.155	.100	1.66	3,950	.102
LOIGM	2/0	133,100	Sector	.155	.155	.110	1.75	4,500	.0811
LOIJP	3/0	167,800	Sector	.155	.155	.110	1.82	4,920	.0642
LOIRY	4/0	211,600	Sector	.155	.155	.110	1.90	5,410	.0509
LOJAM	...	250,000	Sector	.155	.155	.110	1.97	5,850	.0431
LOJEN	...	300,000	Sector	.155	.155	.115	2.06	6,630	.0360
LOJIP	...	350,000	Sector	.155	.155	.115	2.13	7,140	.0308
LOJMA	...	400,000	Sector	.155	.155	.115	2.20	7,650	.0270
LOJNE	...	500,000	Sector	.155	.155	.115	2.32	8,590	.0216
LOJUR	...	600,000	Sector	.155	.155	.125	2.45	9,880	.0180
LOJYS	...	750,000	Sector	.155	.155	.125	2.60	11,280	.0144
LOKAN	...	1,000,000	Sector	.155	.155	.135	2.84	13,860	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



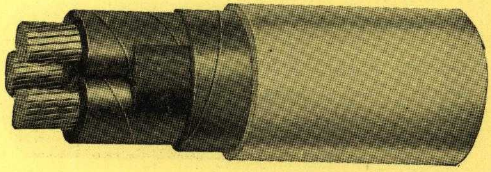
THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOKEP	8	16,510	Round	.065	.030	.085	.83	1,340	.654
LOKNA	6	26,250	Sector	.065	.030	.085	.83	1,400	.410
LOKOR	4	41,740	Sector	.065	.030	.085	.92	1,700	.259
LOKPE	2	66,370	Sector	.065	.030	.085	1.03	2,110	.162
LOKRO	1	83,690	Sector	.065	.030	.095	1.13	2,540	.129
LOKUS	1/0	105,500	Sector	.065	.030	.095	1.20	2,870	.102
LOKYT	2/0	133,100	Sector	.065	.030	.095	1.29	3,290	.0811
LOLAP	3/0	167,800	Sector	.065	.030	.095	1.38	3,780	.0642
LOLIR	4/0	211,600	Sector	.065	.030	.100	1.50	4,580	.0509
LOLOS	...	250,000	Sector	.080	.030	.100	1.65	5,320	.0431
LOLPA	...	300,000	Sector	.080	.030	.110	1.77	6,220	.0360
LOLSO	...	350,000	Sector	.080	.030	.110	1.86	6,900	.0308
LOLUT	...	400,000	Sector	.080	.030	.110	1.96	7,590	.0270
LOLVY	...	500,000	Sector	.080	.030	.115	2.12	9,120	.0216
LOLYV	...	600,000	Sector	.080	.030	.115	2.26	10,390	.0180
LOMER	...	750,000	Sector	.080	.030	.125	2.48	12,630	.0144
LOMRE	...	1,000,000	Sector	.080	.045	.135	2.81	16,180	.0108

THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOMTO	8	16,510	Round	.080	.030	.085	.89	1,460	.654
LOMUV	6	26,250	Sector	.080	.030	.085	.89	1,520	.410
LOMWY	4	41,740	Sector	.080	.030	.085	.98	1,820	.259
LONAR	2	66,370	Sector	.080	.030	.095	1.11	2,370	.162
LONIT	1	83,690	Sector	.080	.030	.095	1.19	2,680	.129
LONOV	1/0	105,500	Sector	.080	.030	.095	1.26	3,020	.102
LONRA	2/0	133,100	Sector	.080	.030	.095	1.35	3,440	.0811
LONSE	3/0	167,800	Sector	.080	.030	.100	1.45	4,110	.0642
LONVO	4/0	211,600	Sector	.080	.030	.100	1.56	4,760	.0509
LONYX	...	250,000	Sector	.080	.045	.100	1.68	5,410	.0431
LOOCK	...	300,000	Sector	.080	.045	.110	1.80	6,320	.0360
LOOGN	...	350,000	Sector	.080	.045	.110	1.89	7,000	.0308
LOOLS	...	400,000	Sector	.080	.045	.110	1.98	7,700	.0270
LOONV	...	500,000	Sector	.080	.045	.115	2.15	9,230	.0216
LOORZ	...	600,000	Sector	.080	.045	.115	2.29	10,510	.0180
LOOSB	...	750,000	Sector	.080	.045	.125	2.51	12,760	.0144
LOOVD	...	1,000,000	Sector	.080	.045	.135	2.81	16,180	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 3,000 VOLTS

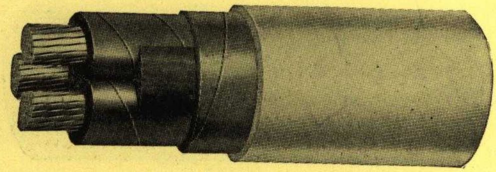
Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOOWF	8	16,510	Round	.080	.045	.085	.92	1,530	.654
LOPAS	6	26,250	Sector	.080	.045	.085	.92	1,590	.410
LOPET	4	41,740	Sector	.080	.045	.085	1.01	1,890	.259
LOPIV	2	66,370	Sector	.080	.045	.095	1.14	2,440	.162
LOPSA	1	83,690	Sector	.080	.045	.095	1.22	2,750	.129
LOPTE	1/0	105,500	Sector	.080	.045	.095	1.29	3,090	.102
LOPUX	2/0	133,100	Sector	.080	.045	.095	1.38	3,520	.0811
LOPWO	3/0	167,800	Sector	.080	.045	.100	1.48	4,200	.0642
LOPZY	4/0	211,600	Sector	.080	.045	.100	1.59	4,850	.0509
LORAV	...	250,000	Sector	.080	.045	.100	1.68	5,460	.0431
LORCY	...	300,000	Sector	.080	.045	.110	1.80	6,320	.0360
LORIX	...	350,000	Sector	.080	.045	.110	1.89	7,000	.0308
LOROZ	...	400,000	Sector	.080	.045	.110	1.98	7,700	.0270
LORUB	...	500,000	Sector	.080	.045	.115	2.15	9,230	.0216
LORVA	...	600,000	Sector	.080	.045	.115	2.29	10,510	.0180
LORWE	...	750,000	Sector	.080	.045	.125	2.51	12,760	.0144
LORZO	...	1,000,000	Sector	.080	.045	.135	2.81	16,180	.0108

THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOSBO	8	16,510	Round	.095	.045	.085	.99	1,660	.654
LOSIZ	6	26,250	Round	.095	.045	.085	1.07	1,910	.410
LOSOB	4	41,740	Round	.095	.045	.095	1.19	2,400	.259
LOSUC	2	66,370	Sector	.095	.045	.095	1.20	2,580	.162
LOSWA	1	83,690	Sector	.095	.045	.095	1.28	2,900	.129
LOSYE	1/0	105,500	Sector	.095	.045	.095	1.35	3,240	.102
LOTAY	2/0	133,100	Sector	.095	.045	.100	1.45	3,850	.0811
LOTEZ	3/0	167,800	Sector	.095	.045	.100	1.54	4,370	.0642
LOTIB	4/0	211,600	Sector	.095	.045	.100	1.65	5,030	.0509
LOTOC	...	250,000	Sector	.095	.045	.110	1.76	5,810	.0431
LOTUD	...	300,000	Sector	.095	.045	.110	1.86	6,520	.0360
LOTYA	...	350,000	Sector	.095	.045	.110	1.95	7,200	.0308
LOTZE	...	400,000	Sector	.095	.045	.115	2.05	8,150	.0270
LOUKS	...	500,000	Sector	.095	.045	.115	2.21	9,450	.0216
LOULT	...	600,000	Sector	.095	.045	.125	2.37	11,050	.0180
LOUMV	...	750,000	Sector	.095	.045	.125	2.57	13,020	.0144
LOUPY	...	1,000,000	Sector	.095	.045	.135	2.87	16,460	.0108

PAPER INSULATED—LEAD SHEATHED CABLE

Compound-Filled Type



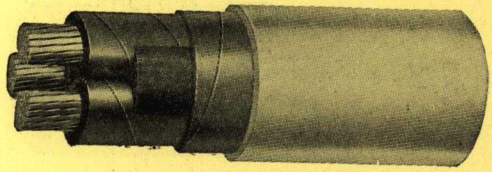
THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) — 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25° C
LOURB	8	16,510	Round	.095	.065	.085	1.03	1,750	.654
LOUSC	6	26,250	Round	.095	.065	.095	1.13	2,140	.410
LOVAZ	4	41,740	Round	.095	.065	.095	1.23	2,500	.259
LOVBE	2	66,370	Sector	.095	.065	.095	1.24	2,680	.162
LOVDO	1	83,690	Sector	.095	.065	.095	1.32	3,000	.129
LOVEB	1/0	105,500	Sector	.095	.065	.095	1.39	3,350	.102
LOVGY	2/0	133,100	Sector	.095	.065	.100	1.49	3,960	.0811
LOVIC	3/0	167,800	Sector	.095	.065	.100	1.58	4,490	.0642
LOVOD	4/0	211,600	Sector	.095	.065	.100	1.69	5,160	.0509
LOVUF	...	250,000	Sector	.095	.065	.110	1.80	5,940	.0431
LOVYG	...	300,000	Sector	.095	.065	.110	1.90	6,660	.0360
LOVZA	...	350,000	Sector	.095	.065	.110	1.99	7,350	.0308
LOWBA	...	400,000	Sector	.095	.065	.115	2.09	8,300	.0270
LOWEC	...	500,000	Sector	.095	.065	.115	2.25	9,650	.0216
LOWFO	...	600,000	Sector	.095	.065	.125	2.41	11,220	.0180
LOWHY	...	750,000	Sector	.095	.065	.125	2.61	13,190	.0144
LOWID	...	1,000,000	Sector	.095	.065	.135	2.91	16,650	.0108

THREE CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) — 6,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOURB	8	16,510	Round	.095	.065	.085	1.03	1,750	.654
LOUSC	6	26,250	Round	.095	.065	.095	1.13	2,140	.410
LOVAZ	4	41,740	Round	.095	.065	.095	1.23	2,500	.259
LOVBE	2	66,370	Sector	.095	.065	.095	1.24	2,680	.162
LOVDO	1	83,690	Sector	.095	.065	.095	1.32	3,000	.129
LOVEB	1/0	105,500	Sector	.095	.065	.095	1.39	3,350	.102
LOVGY	2/0	133,100	Sector	.095	.065	.100	1.49	3,960	.0811
LOVIC	3/0	167,800	Sector	.095	.065	.100	1.58	4,490	.0642
LOVOD	4/0	211,600	Sector	.095	.065	.100	1.69	5,160	.0509
LOVUF	...	250,000	Sector	.095	.065	.110	1.80	5,940	.0431
LOVYG	...	300,000	Sector	.095	.065	.110	1.90	6,660	.0360
LOVZA	...	350,000	Sector	.095	.065	.110	1.99	7,350	.0308
LOWBA	...	400,000	Sector	.095	.065	.115	2.09	8,300	.0270
LOWEC	...	500,000	Sector	.095	.065	.115	2.25	9,650	.0216
LOWFO	...	600,000	Sector	.095	.065	.125	2.41	11,220	.0180
LOWHY	...	750,000	Sector	.095	.065	.125	2.61	13,190	.0144
LOWID	...	1,000,000	Sector	.095	.065	.135	2.91	16,650	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



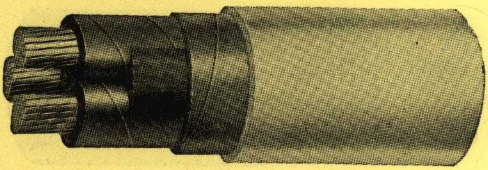
THREE CONDUCTOR—BELTED (Grounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOWOF	8	16,510	Round	.110	.065	.095	1.11	2,020	.654
LOWHY	6	26,250	Round	.110	.065	.095	1.19	2,290	.410
LOWID	4	41,740	Round	.110	.065	.095	1.30	2,670	.259
LOWOF	2	66,370	Sector	.110	.065	.095	1.30	2,830	.162
LOWUG	1	83,690	Sector	.110	.065	.095	1.38	3,150	.129
LOWYH	1/0	105,500	Sector	.110	.065	.100	1.46	3,680	.102
LOYAC	2/0	133,100	Sector	.110	.065	.100	1.55	4,140	.0811
LOYCA	3/0	167,800	Sector	.110	.065	.100	1.64	4,680	.0642
LOYDE	4/0	211,600	Sector	.110	.065	.110	1.77	5,560	.0509
LOYED	...	250,000	Sector	.110	.065	.110	1.86	6,140	.C431
LOYGO	...	300,000	Sector	.110	.065	.110	1.96	6,870	.0360
LOYIF	...	350,000	Sector	.110	.065	.115	2.06	7,810	.0308
LOYJS	...	400,000	Sector	.110	.065	.115	2.15	8,520	.0270
LOYKT	...	500,000	Sector	.110	.065	.115	2.31	9,830	.0216
LOYLV	...	600,000	Sector	.110	.065	.125	2.47	11,470	.0180
LOYOG	...	750,000	Sector	.110	.065	.135	2.69	13,780	.0144
LOYPZ	...	1,000,000	Sector	.110	.065	.135	2.97	16,920	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LUGVY	8	16,510	Round	.110	.095	.095	1.17	2,170	.654
LUGYV	6	26,250	Round	.110	.095	.095	1.25	2,440	.410
LUHER	4	41,740	Round	.110	.095	.095	1.36	2,840	.259
LUHRE	2	66,370	Sector	.110	.095	.095	1.36	2,990	.162
LUHTO	1	83,690	Sector	.110	.095	.100	1.45	3,490	.129
LUHUV	1/0	105,500	Sector	.110	.095	.100	1.52	3,850	.102
LUHWY	2/0	133,100	Sector	.110	.095	.100	1.61	4,320	.0811
LUIJT	3/0	167,800	Sector	.110	.095	.100	1.70	4,870	.0642
LUIRD	4/0	211,600	Sector	.110	.095	.110	1.83	5,760	.0509
LUJAR	...	250,000	Sector	.110	.095	.110	1.92	6,350	.0431
LUJIT	...	300,000	Sector	.110	.095	.110	2.02	7,080	.0360
LUJOV	...	350,000	Sector	.110	.095	.115	2.12	8,030	.0308
LUJRA	...	400,000	Sector	.110	.095	.115	2.21	8,740	.0270
LUJSE	...	500,000	Sector	.110	.095	.125	2.39	10,390	.0216
LUJVO	...	600,000	Sector	.110	.095	.125	2.53	11,730	.0180
LUJYZ	...	750,000	Sector	.110	.095	.135	2.75	14,050	.0144
LUKET	...	1,000,000	Sector	.110	.095	.140	3.04	17,580	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



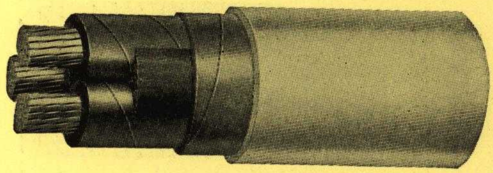
THREE CONDUCTOR—BELTED — 8,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LOWHY	6	26,250	Round	.110	.065	.095	1.19	2,290	.410
LOWID	4	41,740	Round	.110	.065	.095	1.30	2,670	.259
LOWOF	2	66,370	Sector	.110	.065	.095	1.30	2,830	.162
LOWUG	1	83,690	Sector	.110	.065	.095	1.38	3,150	.129
LOWYH	1/0	105,500	Sector	.110	.065	.100	1.46	3,680	.102
LOYAC	2/0	133,100	Sector	.110	.065	.100	1.55	4,140	.0811
LOYCA	3/0	167,800	Sector	.110	.065	.100	1.64	4,680	.0642
LOYDE	4/0	211,600	Sector	.110	.065	.110	1.77	5,560	.0509
LOYED	...	250,000	Sector	.110	.065	.110	1.86	6,140	.0431
LOYGO	...	300,000	Sector	.110	.065	.110	1.96	6,870	.0360
LOYIF	...	350,000	Sector	.110	.065	.115	2.06	7,810	.0308
LOYJS	...	400,000	Sector	.110	.065	.115	2.15	8,520	.0270
LOYKT	...	500,000	Sector	.110	.065	.115	2.31	9,830	.0216
LOYLV	...	600,000	Sector	.110	.065	.125	2.47	11,470	.0180
LOYOG	...	750,000	Sector	.110	.065	.135	2.69	13,780	.0144
LOYPZ	...	1,000,000	Sector	.110	.065	.135	2.97	16,920	.0108

THREE CONDUCTOR—BELTED — 8,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUKIV	6	26,250	Round	.110	.110	.095	1.28	2,510	.410
LUKSA	4	41,740	Round	.110	.110	.095	1.39	2,910	.259
LUKTE	2	66,370	Sector	.110	.110	.095	1.39	3,070	.162
LUKUX	1	83,690	Sector	.110	.110	.100	1.48	3,580	.129
LUKWO	1/0	105,500	Sector	.110	.110	.100	1.55	3,930	.102
LUKZY	2/0	133,100	Sector	.110	.110	.100	1.64	4,410	.0811
LULAT	3/0	167,800	Sector	.110	.110	.110	1.75	5,170	.0642
LULEV	4/0	211,600	Sector	.110	.110	.110	1.86	5,860	.0509
LULOY	...	250,000	Sector	.110	.110	.110	1.95	6,450	.0431
LULTA	...	300,000	Sector	.110	.110	.115	2.06	7,430	.0360
LULUZ	...	350,000	Sector	.110	.110	.115	2.15	8,140	.0308
LULVE	...	400,000	Sector	.110	.110	.115	2.24	8,850	.0270
LULYO	...	500,000	Sector	.110	.110	.125	2.42	10,520	.0216
LUMAV	...	600,000	Sector	.110	.110	.125	2.56	11,860	.0180
LUMCY	...	750,000	Sector	.110	.110	.135	2.78	14,190	.0144
LUMIX	...	1,000,000	Sector	.110	.110	.140	3.07	17,740	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



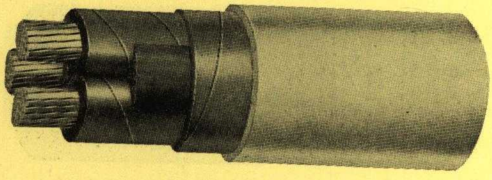
THREE CONDUCTOR—BELTED (Grounded Neutral) 9,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOYUH	6	26,250	Round	.125	.065	.095	1.26	2,450	.410
LOYZK	4	41,740	Round	.125	.065	.095	1.36	2,830	.259
LOZAD	2	66,370	Sector	.125	.065	.095	1.36	2,980	.162
LOZDA	1	83,690	Sector	.125	.065	.100	1.45	3,480	.129
LOZEF	1/0	105,500	Sector	.125	.065	.100	1.52	3,850	.102
LOZFE	2/0	133,100	Sector	.125	.065	.100	1.61	4,320	.0811
LOZHO	3/0	167,800	Sector	.125	.065	.100	1.70	4,870	.0642
LOZIG	4/0	211,600	Sector	.125	.065	.110	1.83	5,760	.0509
LOZKY	...	250,000	Sector	.125	.065	.110	1.92	6,350	.0431
LOZOH	...	300,000	Sector	.125	.065	.110	2.02	7,070	.0360
LOZUJ	...	350,000	Sector	.125	.065	.115	2.12	8,030	.0308
LOZYK	...	400,000	Sector	.125	.065	.115	2.21	8,730	.0270
LUAKS	...	500,000	Sector	.125	.065	.125	2.39	10,380	.0216
LUALT	...	600,000	Sector	.125	.065	.125	2.53	11,720	.0180
LUAMV	...	750,000	Sector	.125	.065	.135	2.75	14,040	.0144
LUAPY	...	1,000,000	Sector	.125	.065	.140	3.04	17,590	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 9,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LUMOZ	6	26,250	Round	.125	.125	.095	1.38	2,770	.410
LUMUB	4	41,740	Round	.125	.125	.100	1.49	3,330	.259
LUMVA	2	66,370	Sector	.125	.125	.100	1.49	3,480	.162
LUMWE	1	83,690	Sector	.125	.125	.100	1.57	3,840	.129
LUMZO	1/0	105,500	Sector	.125	.125	.100	1.64	4,210	.102
LUNBO	2/0	133,100	Sector	.125	.125	.110	1.75	4,900	.0811
LUNIZ	3/0	167,800	Sector	.125	.125	.110	1.84	5,470	.0642
LUNOB	4/0	211,600	Sector	.125	.125	.110	1.95	6,170	.0509
LUNUC	...	250,000	Sector	.125	.125	.115	2.05	7,020	.0431
LUNYE	...	300,000	Sector	.125	.125	.115	2.15	7,760	.0360
LUOGS	...	350,000	Sector	.125	.125	.115	2.24	8,470	.0308
LUOHT	...	400,000	Sector	.125	.125	.115	2.33	9,190	.0270
LUOLY	...	500,000	Sector	.125	.125	.125	2.51	10,890	.0216
LUONB	...	600,000	Sector	.125	.125	.125	2.65	12,250	.0180
LUORF	...	750,000	Sector	.125	.125	.135	2.87	14,610	.0144
LUOWK	...	1,000,000	Sector	.125	.125	.140	3.16	18,200	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



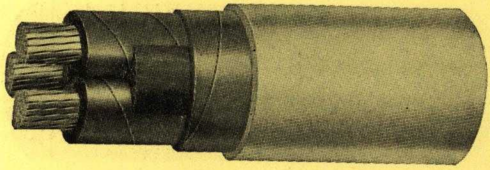
THREE CONDUCTOR—BELTED (Grounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LOYUH	6	26,250	Round	.125	.065	.095	1.26	2,450	.410
LOYZK	4	41,740	Round	.125	.065	.095	1.36	2,830	.259
LOZAD	2	66,370	Sector	.125	.065	.095	1.36	2,980	.162
LOZDA	1	83,690	Sector	.125	.065	.100	1.45	3,480	.129
LOZEF	1/0	105,500	Sector	.125	.065	.100	1.52	3,850	.102
LOZFE	2/0	133,100	Sector	.125	.065	.100	1.61	4,320	.0811
LOZHO	3/0	167,800	Sector	.125	.065	.100	1.70	4,870	.0642
LOZIG	4/0	211,600	Sector	.125	.065	.110	1.83	5,760	.0509
LOZKY	...	250,000	Sector	.125	.065	.110	1.92	6,350	.0431
LOZOH	...	300,000	Sector	.125	.065	.110	2.02	7,070	.0360
LOZUJ	...	350,000	Sector	.125	.065	.115	2.12	8,030	.0308
LOZYK	...	400,000	Sector	.125	.065	.115	2.21	8,730	.0270
LUAKS	...	500,000	Sector	.125	.065	.125	2.39	10,380	.0216
LUALT	...	600,000	Sector	.125	.065	.125	2.53	11,720	.0180
LUAMV	...	750,000	Sector	.125	.065	.135	2.75	14,040	.0144
LUAPY	...	1,000,000	Sector	.125	.065	.140	3.04	17,590	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LUMOZ	6	26,250	Round	.125	.125	.095	1.38	2,770	.410
LUMUB	4	41,740	Round	.125	.125	.100	1.49	3,330	.259
LUMVA	2	66,370	Sector	.125	.125	.100	1.49	3,480	.162
LUMWE	1	83,690	Sector	.125	.125	.100	1.57	3,840	.129
LUMZO	1/0	105,500	Sector	.125	.125	.100	1.64	4,210	.102
LUNBO	2/0	133,100	Sector	.125	.125	.110	1.75	4,900	.0811
LUNIZ	3/0	167,800	Sector	.125	.125	.110	1.84	5,470	.0642
LUNOB	4/0	211,600	Sector	.125	.125	.110	1.95	6,170	.0509
LUNUC	...	250,000	Sector	.125	.125	.115	2.05	7,020	.0431
LUNYE	...	300,000	Sector	.125	.125	.115	2.15	7,760	.0360
LUOGS	...	350,000	Sector	.125	.125	.115	2.24	8,470	.0308
LUOHT	...	400,000	Sector	.125	.125	.115	2.33	9,190	.0270
LUOLY	...	500,000	Sector	.125	.125	.125	2.51	10,890	.0216
LUONB	...	600,000	Sector	.125	.125	.125	2.65	12,250	.0180
LUORF	...	750,000	Sector	.125	.125	.135	2.87	14,610	.0144
LUOWK	...	1,000,000	Sector	.125	.125	.140	3.16	18,200	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



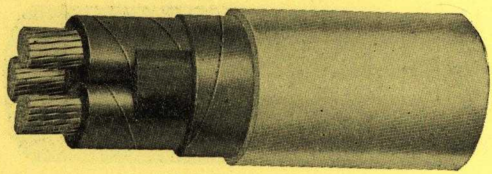
THREE CONDUCTOR—BELTED (Grounded Neutral) 11,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUARB	6	26,250	Round	.125	.080	.095	1.29	2,530	.410
LUASC	4	41,740	Round	.125	.080	.095	1.39	2,910	.259
LUAWG	2	66,370	Round	.125	.080	.100	1.53	3,630	.162
LUBAK	1	83,690	Round	.125	.080	.100	1.61	3,880	.129
LUBEL	1/0	105,500	Sector	.125	.080	.100	1.55	3,930	.102
LUBKA	2/0	133,100	Sector	.125	.080	.100	1.64	4,410	.0811
LUBLE	3/0	167,800	Sector	.125	.080	.110	1.75	5,170	.0642
LUBNO	4/0	211,600	Sector	.125	.080	.110	1.86	5,860	.0509
LUBON	...	250,000	Sector	.125	.080	.110	1.95	6,450	.0431
LUBUP	...	300,000	Sector	.125	.080	.115	2.06	7,430	.0360
LUCAL	...	350,000	Sector	.125	.080	.115	2.15	8,130	.0308
LUCEM	...	400,000	Sector	.125	.080	.115	2.24	8,840	.0270
LUCLA	...	500,000	Sector	.125	.080	.125	2.42	10,510	.0216
LUCOP	...	600,000	Sector	.125	.080	.125	2.56	11,850	.0180
LUCPO	...	750,000	Sector	.125	.080	.135	2.78	14,190	.0144
LUCRY	...	1,000,000	Sector	.125	.080	.140	3.07	17,740	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 11,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUOZM	6	26,250	Round	.125	.125	.095	1.38	2,770	.410
LUPAY	4	41,740	Round	.125	.125	.100	1.49	3,330	.259
LUPCO	2	66,370	Round	.125	.125	.100	1.62	3,900	.162
LUPEZ	1	83,690	Round	.125	.125	.100	1.70	4,170	.129
LUPIB	1/0	105,500	Sector	.125	.125	.100	1.64	4,210	.102
LUPOC	2/0	133,100	Sector	.125	.125	.110	1.75	4,900	.0811
LUPUD	3/0	167,800	Sector	.125	.125	.110	1.84	5,470	.0642
LUPYA	4/0	211,600	Sector	.125	.125	.110	1.95	6,170	.0509
LUPZE	...	250,000	Sector	.125	.125	.115	2.05	7,020	.0431
LURAB	...	300,000	Sector	.125	.125	.115	2.15	7,760	.0360
LURBA	...	350,000	Sector	.125	.125	.115	2.24	8,470	.0308
LURCE	...	400,000	Sector	.125	.125	.115	2.33	9,190	.0270
LUREC	...	500,000	Sector	.125	.125	.125	2.51	10,890	.0216
LURFO	...	600,000	Sector	.125	.125	.125	2.65	12,250	.0180
LURHY	...	750,000	Sector	.125	.125	.135	2.87	14,610	.0144
LUROF	...	1,000,000	Sector	.125	.125	.140	3.16	18,200	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



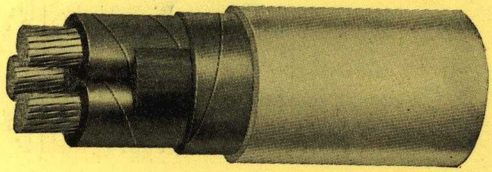
THREE CONDUCTOR—BELTED (Grounded Neutral) 12,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Overall Dia-meter, Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance Ohms/ 1,000′ @ 25°C.
LUCYR	6	26,250	Round	.140	.080	.095	1.35	2,690	.410
LUDAM	4	41,740	Round	.140	.080	.100	1.46	3,250	.259
LUDEN	2	66,370	Round	.140	.080	.100	1.59	3,810	.162
LUDIP	1	83,690	Round	.140	.080	.100	1.68	4,190	.129
LUDMA	1/0	105,500	Sector	.140	.080	.100	1.61	4,120	.102
LUDNE	2/0	133,100	Sector	.140	.080	.100	1.70	4,600	.0811
LUDSY	3/0	167,800	Sector	.140	.080	.110	1.81	5,370	.0642
LUDUR	4/0	211,600	Sector	.140	.080	.110	1.92	6,060	.0509
LUDYS	...	250,000	Sector	.140	.080	.110	2.01	6,660	.0431
LUEJS	...	300,000	Sector	.140	.080	.115	2.12	7,640	.0360
LUEKT	...	350,000	Sector	.140	.080	.115	2.21	8,350	.0308
LUELV	...	400,000	Sector	.140	.080	.115	2.30	9,070	.0270
LUENY	...	500,000	Sector	.140	.080	.125	2.48	10,760	.0216
LUEPZ	...	600,000	Sector	.140	.080	.125	2.62	12,110	.0180
LUERC	...	750,000	Sector	.140	.080	.135	2.84	14,460	.0144
LUEVG	...	1,000,000	Sector	.140	.080	.140	3.13	18,030	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 12,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Overall Dia-meter, Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance Ohms/ 1,000′ @ 25°C.
LURUG	6	26,250	Round	.140	.140	.100	1.48	3,190	.410
LURYH	4	41,740	Round	.140	.140	.100	1.58	3,600	.259
LUSAC	2	66,370	Round	.140	.140	.110	1.73	4,390	.162
LUSCA	1	83,690	Round	.140	.140	.110	1.82	4,800	.129
LUSDE	1/0	105,500	Sector	.140	.140	.110	1.75	4,700	.102
LUSED	2/0	133,100	Sector	.140	.140	.110	1.84	5,200	.0811
LUSGO	3/0	167,800	Sector	.140	.140	.110	1.93	5,780	.0642
LUSIF	4/0	211,600	Sector	.140	.140	.115	2.05	6,740	.0509
LUSJY	...	250,000	Sector	.140	.140	.115	2.14	7,350	.0431
LUSOG	...	300,000	Sector	.140	.140	.115	2.24	8,080	.0360
LUSUH	...	350,000	Sector	.140	.140	.115	2.33	8,810	.0308
LUSYJ	...	400,000	Sector	.140	.140	.125	2.44	9,880	.0270
LUTAD	...	500,000	Sector	.140	.140	.125	2.60	11,270	.0216
LUTDA	...	600,000	Sector	.140	.140	.135	2.76	12,980	.0180
LUTEF	...	750,000	Sector	.140	.140	.135	2.96	15,030	.0144
LUTHO	...	1,000,000	Sector	.140	.140	.140	3.25	18,650	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



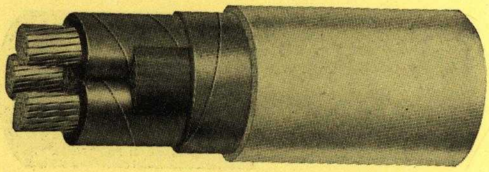
THREE CONDUCTOR—BELTED 13,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms, 1,000′ @ 25°C
LUCYR	6	26,250	Round	.140	.080	.095	1.35	2,690	.410
LUDAM	4	41,740	Round	.140	.080	.100	1.46	3,250	.259
LUDEN	2	66,370	Round	.140	.080	.100	1.59	3,810	.162
LUDIP	1	83,690	Round	.140	.080	.100	1.68	4,190	.129
LUDMA	1/0	105,500	Sector	.140	.080	.100	1.61	4,120	.102
LUDNE	2/0	133,100	Sector	.140	.080	.100	1.70	4,600	.0811
LUDSY	3/0	167,800	Sector	.140	.080	.110	1.81	5,370	.0642
LUDUR	4/0	211,600	Sector	.140	.080	.110	1.92	6,060	.0509
LUDYS	...	250,000	Sector	.140	.080	.110	2.01	6,660	.0431
LUEJS	...	300,000	Sector	.140	.080	.115	2.12	7,640	.0360
LUEKT	...	350,000	Sector	.140	.080	.115	2.21	8,350	.0308
LUELV	...	400,000	Sector	.140	.080	.115	2.30	9,070	.0270
LUENY	...	500,000	Sector	.140	.080	.125	2.48	10,760	.0216
LUEPZ	...	600,000	Sector	.140	.080	.125	2.62	12,110	.0180
LUERC	...	750,000	Sector	.140	.080	.135	2.84	14,460	.0144
LUEVG	...	1,000,000	Sector	.140	.080	.140	3.13	18,030	.0108

THREE CONDUCTOR—BELTED 13,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LURUG	6	26,250	Round	.140	.140	.100	1.48	3,190	.410
LURYH	4	41,740	Round	.140	.140	.100	1.58	3,600	.259
LUSAC	2	66,370	Round	.140	.140	.110	1.73	4,390	.162
LUSCA	1	83,690	Round	.140	.140	.110	1.82	4,800	.129
LUSDE	1/0	105,500	Sector	.140	.140	.110	1.75	4,700	.102
LUSED	2/0	133,100	Sector	.140	.140	.110	1.84	5,200	.0811
LUSGO	3/0	167,800	Sector	.140	.140	.110	1.93	5,780	.0642
LUSIF	4/0	211,600	Sector	.140	.140	.115	2.05	6,740	.0509
LUSJY	...	250,000	Sector	.140	.140	.115	2.14	7,350	.0431
LUSOG	...	300,000	Sector	.140	.140	.115	2.24	8,080	.0360
LUSUH	...	350,000	Sector	.140	.140	.115	2.33	8,810	.0308
LUSYJ	...	400,000	Sector	.140	.140	.125	2.44	9,880	.0270
LUTAD	...	500,000	Sector	.140	.140	.125	2.60	11,270	.0216
LUTDA	...	600,000	Sector	.140	.140	.135	2.76	12,980	.0180
LUTEF	...	750,000	Sector	.140	.140	.135	2.96	15,030	.0144
LUTHO	...	1,000,000	Sector	.140	.140	.140	3.25	18,650	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



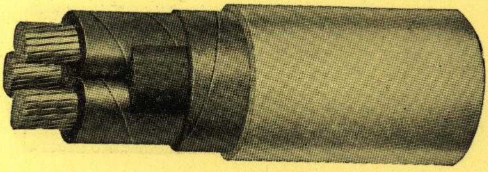
THREE CONDUCTOR—BELTED (Grounded Neutral) — 14,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUEZK	6	26,250	Round	.155	.080	.100	1.43	3,040	.410
LUFAN	4	41,740	Round	.155	.080	.100	1.53	3,440	.259
LUFEP	2	66,370	Round	.155	.080	.100	1.66	4,010	.162
LUFNA	1	83,690	Round	.155	.080	.110	1.76	4,590	.129
LUFOR	1/0	105,500	Sector	.155	.080	.100	1.67	4,300	.102
LUFPE	2/0	133,100	Sector	.155	.080	.110	1.78	5,000	.0811
LUFRO	3/0	167,800	Sector	.155	.080	.110	1.87	5,570	.0642
LUFTY	4/0	211,600	Sector	.155	.080	.110	1.98	6,270	.0509
LUFUS	...	250,000	Sector	.155	.080	.115	2.08	7,120	.0431
LUFYT	...	300,000	Sector	.155	.080	.115	2.18	7,880	.0360
LUGAP	...	350,000	Sector	.155	.080	.115	2.27	8,580	.0308
LUGIR	...	400,000	Sector	.155	.080	.125	2.38	9,630	.0270
LUGOS	...	500,000	Sector	.155	.080	.125	2.54	11,010	.0216
LUGPA	...	600,000	Sector	.155	.080	.135	2.70	12,700	.0180
LUGSO	...	750,000	Sector	.155	.080	.135	2.90	14,740	.0144
LUGUT	...	1,000,000	Sector	.155	.080	.140	3.19	18,330	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) — 14,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUTIG	6	26,250	Round	.155	.155	.100	1.58	3,480	.410
LUTOH	4	41,740	Round	.155	.155	.100	1.68	3,890	.259
LUTUJ	2	66,370	Round	.155	.155	.110	1.83	4,700	.162
LUTYK	1	83,690	Round	.155	.155	.110	1.91	5,100	.129
LUVAF	1/0	105,500	Sector	.155	.155	.110	1.84	5,000	.102
LUVEG	2/0	133,100	Sector	.155	.155	.110	1.93	5,510	.0811
LUVFA	3/0	167,800	Sector	.155	.155	.110	2.02	6,090	.0642
LUVGE	4/0	211,600	Sector	.155	.155	.115	2.14	7,060	.0509
LUVJO	...	250,000	Sector	.155	.155	.115	2.23	7,670	.0431
LUVOJ	...	300,000	Sector	.155	.155	.115	2.33	8,430	.0360
LUVUK	...	350,000	Sector	.155	.155	.125	2.44	9,500	.0308
LUVYL	...	400,000	Sector	.155	.155	.125	2.53	10,260	.0270
LUWAG	...	500,000	Sector	.155	.155	.135	2.71	12,000	.0216
LUWHE	...	600,000	Sector	.155	.155	.135	2.85	13,400	.0180
LUWIJ	...	750,000	Sector	.155	.155	.140	3.06	15,840	.0144
LUWOK	...	1,000,000	Sector	.155	.155	.155	3.37	19,940	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



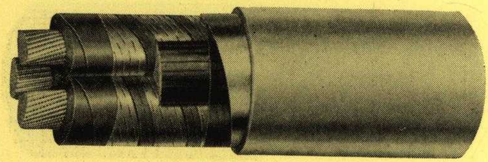
THREE CONDUCTOR—BELTED (Grounded Neutral) — 15,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUEZK	6	26,250	Round	.155	.080	.100	1.43	3,040	.410
LUFAN	4	41,740	Round	.155	.080	.100	1.53	3,440	.259
LUFEP	2	66,370	Round	.155	.080	.100	1.66	4,010	.162
LUFNA	1	83,690	Round	.155	.080	.110	1.76	4,590	.129
LUFOR	1/0	105,500	Sector	.155	.080	.100	1.67	4,300	.102
LUFPE	2/0	133,100	Sector	.155	.080	.110	1.78	5,000	.0811
LUFRO	3/0	167,800	Sector	.155	.080	.110	1.87	5,570	.0642
LUFTY	4/0	211,600	Sector	.155	.080	.110	1.98	6,270	.0509
LUFUS	...	250,000	Sector	.155	.080	.115	2.08	7,120	.0431
LUFYT	...	300,000	Sector	.155	.080	.115	2.18	7,880	.0360
LUGAP	...	350,000	Sector	.155	.080	.115	2.27	8,580	.0308
LUGIR	...	400,000	Sector	.155	.080	.125	2.38	9,630	.0270
LUGOS	...	500,000	Sector	.155	.080	.125	2.54	11,010	.0216
LUGPA	...	600,000	Sector	.155	.080	.135	2.70	12,700	.0180
LUGSO	...	750,000	Sector	.155	.080	.135	2.90	14,740	.0144
LUGUT	...	1,000,000	Sector	.155	.080	.140	3.19	18,330	.0108

THREE CONDUCTOR—BELTED (Ungrounded Neutral) — 15,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUTIG	6	26,250	Round	.155	.155	.100	1.58	3,480	.410
LUTOH	4	41,740	Round	.155	.155	.100	1.68	3,890	.259
LUTUJ	2	66,370	Round	.155	.155	.110	1.83	4,700	.162
LUTYK	1	83,690	Round	.155	.155	.110	1.91	5,100	.129
LUVAF	1/0	105,500	Sector	.155	.155	.110	1.84	5,000	.102
LUVEG	2/0	133,100	Sector	.155	.155	.110	1.93	5,510	.0811
LUVFA	3/0	167,800	Sector	.155	.155	.110	2.02	6,090	.0642
LUVGE	4/0	211,600	Sector	.155	.155	.115	2.14	7,060	.0509
LUVJO	...	250,000	Sector	.155	.155	.115	2.23	7,670	.0431
LUVOJ	...	300,000	Sector	.155	.155	.115	2.33	8,430	.0360
LUVUK	...	350,000	Sector	.155	.155	.125	2.44	9,500	.0308
LUVYL	...	400,000	Sector	.155	.155	.125	2.53	10,260	.0270
LUWAG	...	500,000	Sector	.155	.155	.135	2.71	12,000	.0216
LUWHE	...	600,000	Sector	.155	.155	.135	2.85	13,400	.0180
LUWIJ	...	750,000	Sector	.155	.155	.140	3.06	15,840	.0144
LUWOK	...	1,000,000	Sector	.155	.155	.155	3.37	19,940	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



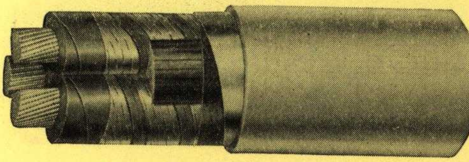
THREE CONDUCTOR—TYPE "H" 16,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NEWIK	4	41,740	Round	.205	.100	1.59	3,570	.259
NEWJE	2	66,370	Round	.205	.110	1.74	4,360	.162
NEWLO	1	83,690	Round	.205	.110	1.82	4,750	.129
NEWOL	1/0	105,500	Round	.205	.110	1.91	5,220	.102
NEWUM	2/0	133,100	Round	.205	.110	2.01	5,770	.0811
NEWYN	3/0	167,800	Round	.205	.115	2.13	6,680	.0642
NEYAJ	4/0	211,600	Sector	.205	.110	2.02	6,420	.0509
NEYCS	...	250,000	Sector	.205	.115	2.12	7,260	.0431
NEYDT	...	300,000	Sector	.205	.115	2.22	8,010	.0360
NEYEK	...	350,000	Sector	.205	.115	2.31	8,740	.0308
NEYIL	...	400,000	Sector	.205	.125	2.42	9,800	.0270
NEYJA	...	500,000	Sector	.205	.125	2.58	11,180	.0216
NEYKE	...	600,000	Sector	.205	.135	2.74	12,880	.0180
NEYMO	...	750,000	Sector	.205	.135	2.94	14,920	.0144
NEYPY	...	1,000,000	Sector	.205	.140	3.23	18,340	.0108

THREE CONDUCTOR—TYPE "H" 16,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIORL	4	41,740	Round	.265	.110	1.86	4,580	.259
NIOSM	2	66,370	Round	.265	.110	1.99	5,200	.162
NIPAF	1	83,690	Round	.265	.115	2.09	5,870	.129
NIPEG	1/0	105,500	Round	.265	.115	2.18	6,370	.102
NIPFA	2/0	133,100	Round	.265	.115	2.28	6,920	.0811
NIPGE	3/0	167,800	Round	.265	.125	2.41	7,940	.0642
NIPJO	4/0	211,600	Sector	.265	.115	2.27	7,530	.0509
NIPLY	...	250,000	Sector	.265	.125	2.38	8,450	.0431
NIPOJ	...	300,000	Sector	.265	.125	2.48	9,260	.0360
NIPUK	...	350,000	Sector	.265	.125	2.57	10,040	.0308
NIPYL	...	400,000	Sector	.265	.135	2.68	11,130	.0270
NIRAH	...	500,000	Sector	.265	.135	2.84	12,570	.0216
NIRHA	...	600,000	Sector	.265	.140	2.99	14,350	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



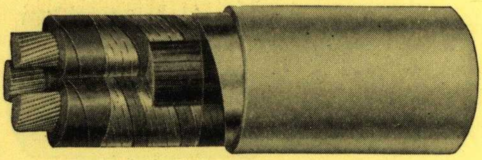
THREE CONDUCTOR—TYPE "H" 17,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NEZAK	4	41,740	Round	.220	.100	1.65	3,780	.259
NEZEL	2	66,370	Round	.220	.110	1.80	4,570	.162
NEZKA	1	83,690	Round	.220	.110	1.89	4,950	.129
NEZLE	1/0	105,500	Round	.220	.110	1.98	5,440	.102
NEZNO	2/0	133,100	Round	.220	.115	2.08	6,250	.0811
NEZON	3/0	167,800	Round	.220	.115	2.19	6,890	.0642
NEZUP	4/0	211,600	Sector	.220	.115	2.09	6,880	.0509
NIADS	...	250,000	Sector	.220	.115	2.18	7,480	.0431
NIAFT	...	300,000	Sector	.220	.115	2.27	8,220	.0360
NIAJY	...	350,000	Sector	.220	.125	2.39	9,290	.0308
NIALB	...	400,000	Sector	.220	.125	2.48	10,050	.0270
NIAND	...	500,000	Sector	.220	.125	2.64	11,430	.0216
NIAPF	...	600,000	Sector	.220	.135	2.80	13,160	.0180
NIAWM	...	750,000	Sector	.220	.140	3.01	15,570	.0144

THREE CONDUCTOR—TYPE "H" 17,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIRIK	4	41,740	Round	.280	.110	1.93	4,800	.259
NIRJE	2	66,370	Round	.280	.115	2.07	5,660	.162
NIRLO	1	83,690	Round	.280	.115	2.15	6,090	.129
NIRNY	1/0	105,500	Round	.280	.115	2.24	6,570	.102
NIROL	2/0	133,100	Round	.280	.125	2.36	7,500	.0811
NIRUM	3/0	167,800	Round	.280	.125	2.47	8,210	.0642
NIRYN	4/0	211,600	Sector	.280	.115	2.33	7,750	.0509
NISAJ	...	250,000	Sector	.280	.125	2.44	8,710	.0431
NISEK	...	300,000	Sector	.280	.125	2.54	9,510	.0360
NISIL	...	350,000	Sector	.280	.125	2.63	10,280	.0308
NISJA	...	400,000	Sector	.280	.135	2.74	11,390	.0270
NISKE	...	500,000	Sector	.280	.135	2.90	12,850	.0216
NISMO	...	600,000	Sector	.280	.140	3.05	14,640	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



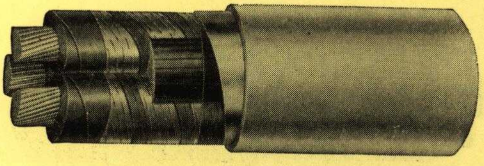
THREE CONDUCTOR—TYPE "H" 18,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size CM.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIBER	4	41,740	Round	.235	.110	1.74	4,170	.259
NIBRE	2	66,370	Round	.235	.110	1.87	4,780	.162
NIBTO	1	83,690	Round	.235	.110	1.95	5,170	.129
NIBUV	1/0	105,500	Round	.235	.115	2.05	5,920	.102
NIBWY	2/0	133,100	Round	.235	.115	2.15	6,480	.0811
NICAR	3/0	167,800	Round	.235	.115	2.26	7,140	.0642
NICIT	4/0	211,600	Sector	.235	.115	2.15	7,090	.0509
NICOV	...	250,000	Sector	.235	.115	2.24	7,700	.0431
NICRA	...	300,000	Sector	.235	.125	2.36	8,780	.0360
NICSE	...	350,000	Sector	.235	.125	2.45	9,540	.0308
NICVO	...	400,000	Sector	.235	.125	2.54	10,290	.0270
NICYX	...	500,000	Sector	.235	.135	2.72	12,020	.0216
NIDAS	...	600,000	Sector	.235	.135	2.86	13,430	.0180
NIDET	...	750,000	Sector	.235	.140	3.07	15,770	.0144

THREE CONDUCTOR—TYPE "H" 18,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIRIK	4	41,740	Round	.280	.110	1.93	4,800	.259
NIRJE	2	66,370	Round	.280	.115	2.07	5,660	.162
NIRLO	1	83,690	Round	.280	.115	2.15	6,090	.129
NIRNY	1/0	105,500	Round	.280	.115	2.24	6,570	.102
NIROL	2/0	133,100	Round	.280	.125	2.36	7,500	.0811
NIRUM	3/0	167,800	Round	.280	.125	2.47	8,210	.0642
NIRYN	4/0	211,600	Sector	.280	.115	2.33	7,750	.0509
NISAJ	...	250,000	Sector	.280	.125	2.44	8,710	.0431
NISEK	...	300,000	Sector	.280	.125	2.54	9,510	.0360
NISIL	...	350,000	Sector	.280	.125	2.63	10,280	.0308
NISJA	...	400,000	Sector	.280	.135	2.74	11,390	.0270
NISKE	...	500,000	Sector	.280	.135	2.90	12,850	.0216
NISMO	...	600,000	Sector	.280	.140	3.05	14,640	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



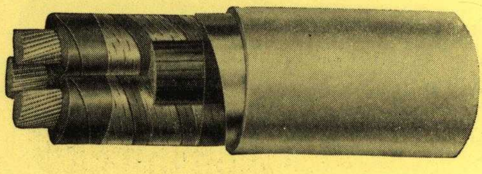
THREE CONDUCTOR—TYPE "H" (Grounded Neutral) — 19,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIBER	4	41,740	Round	.235	.110	1.74	4,170	.259
NIBRE	2	66,370	Round	.235	.110	1.87	4,780	.162
NIBTO	1	83,690	Round	.235	.110	1.95	5,170	.129
NIBUV	1/0	105,500	Round	.235	.115	2.05	5,920	.102
NIBWY	2/0	133,100	Round	.235	.115	2.15	6,480	.0811
NICAR	3/0	167,800	Round	.235	.115	2.26	7,140	.0642
NICIT	4/0	211,600	Sector	.235	.115	2.15	7,090	.0509
NICOV	...	250,000	Sector	.235	.115	2.24	7,700	.0431
NICRA	...	300,000	Sector	.235	.125	2.36	8,780	.0360
NICSE	...	350,000	Sector	.235	.125	2.45	9,540	.0308
NICVO	...	400,000	Sector	.235	.125	2.54	10,290	.0270
NICYX	...	500,000	Sector	.235	.135	2.72	12,020	.0216
NIDAS	...	600,000	Sector	.235	.135	2.86	13,430	.0180
NIDET	...	750,000	Sector	.235	.140	3.07	15,770	.0144

THREE CONDUCTOR—TYPE "H" (Ungrounded Neutral) — 19,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NISPY	4	41,740	Round	.295	.110	1.99	5,020	.259
NISYP	2	66,370	Round	.295	.115	2.14	5,920	.162
NITAK	1	83,690	Round	.295	.115	2.22	6,310	.129
NITEL	1/0	105,500	Round	.295	.115	2.31	6,840	.102
NITKA	2/0	133,100	Round	.295	.125	2.43	7,750	.0811
NITLE	3/0	167,800	Round	.295	.125	2.54	8,460	.0642
NITNO	4/0	211,600	Sector	.295	.125	2.41	8,310	.0509
NITON	...	250,000	Sector	.295	.125	2.50	8,960	.0431
NITUP	...	300,000	Sector	.295	.125	2.60	9,760	.0360
NIUDY	...	350,000	Sector	.295	.135	2.71	10,870	.0308
NIUJD	...	400,000	Sector	.295	.135	2.80	11,660	.0270
NIULG	...	500,000	Sector	.295	.135	2.96	13,120	.0216
NIUPK	...	600,000	Sector	.295	.140	3.11	14,940	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



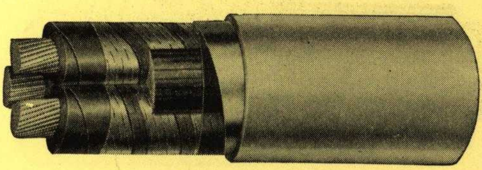
THREE CONDUCTOR—TYPE "H" (Grounded Neutral) 20,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIDIV	2	66,370	Round	.250	.110	1.93	5,000	.162
NIDSA	1	83,690	Round	.250	.110	2.02	5,410	.129
NIDTE	1/0	105,500	Round	.250	.115	2.12	6,140	.102
NIDUX	2/0	133,100	Round	.250	.115	2.21	6,700	.0811
NIDWO	3/0	167,800	Round	.250	.115	2.32	7,360	.0642
NIDZY	4/0	211,600	Sector	.250	.115	2.21	7,310	.0509
NIECS	...	250,000	Sector	.250	.115	2.30	7,920	.0431
NIEDT	...	300,000	Sector	.250	.125	2.42	9,010	.0360
NIELC	...	350,000	Sector	.250	.125	2.51	9,780	.0308
NIEMD	...	400,000	Sector	.250	.125	2.60	10,550	.0270
NIENF	...	500,000	Sector	.250	.135	2.78	12,300	.0216
NIERJ	...	600,000	Sector	.250	.135	2.92	13,710	.0180
NIETL	...	750,000	Sector	.250	.140	3.13	16,160	.0144

THREE CONDUCTOR—TYPE "H" (Ungrounded Neutral) 20,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NISYP	2	66,370	Round	.295	.115	2.14	5,920	.162
NITAK	1	83,690	Round	.295	.115	2.22	6,310	.129
NITEL	1/0	105,500	Round	.295	.115	2.31	6,840	.102
NITKA	2/0	133,100	Round	.295	.125	2.43	7,750	.0811
NITLE	3/0	167,800	Round	.295	.125	2.54	8,460	.0642
NITNO	4/0	211,600	Sector	.295	.125	2.41	8,310	.0509
NITON	...	250,000	Sector	.295	.125	2.50	8,960	.0431
NITUP	...	300,000	Sector	.295	.125	2.60	9,760	.0360
NIUDY	...	350,000	Sector	.295	.135	2.71	10,870	.0308
NIUJD	...	400,000	Sector	.295	.135	2.80	11,660	.0270
NIULG	...	500,000	Sector	.295	.135	2.96	13,120	.0216
NIUPK	...	600,000	Sector	.295	.140	3.11	14,940	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



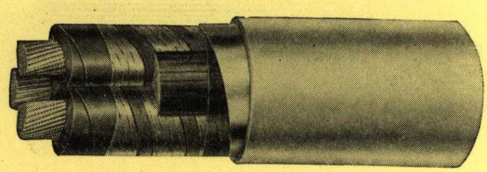
THREE CONDUCTOR—TYPE "H" 21,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIDIV	2	66,370	Round	.250	.110	1.93	5,000	.162
NIDSA	1	83,690	Round	.250	.110	2.02	5,410	.129
NIDTE	1/0	105,500	Round	.250	.115	2.12	6,140	.102
NIDUX	2/0	133,100	Round	.250	.115	2.21	6,700	.0811
NIDWO	3/0	167,800	Round	.250	.115	2.32	7,360	.0642
NIDZY	4/0	211,600	Sector	.250	.115	2.21	7,310	.0509
NIECS	...	250,000	Sector	.250	.115	2.30	7,920	.0431
NIEDT	...	300,000	Sector	.250	.125	2.42	9,010	.0360
NIELC	...	350,000	Sector	.250	.125	2.51	9,780	.0308
NIEMD	...	400,000	Sector	.250	.125	2.60	10,550	.0270
NIENF	...	500,000	Sector	.250	.135	2.78	12,300	.0216
NIERJ	...	600,000	Sector	.250	.135	2.92	13,710	.0180
NIETL	...	750,000	Sector	.250	.140	3.13	16,160	.0144

THREE CONDUCTOR—TYPE "H" 21,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIURM	2	66,370	Round	.315	.115	2.22	6,190	.162
NIUZT	1	83,690	Round	.315	.115	2.31	6,620	.129
NIVAL	1/0	105,500	Round	.315	.125	2.41	7,480	.102
NIVEM	2/0	133,100	Round	.315	.125	2.51	8,090	.0811
NIVLA	3/0	167,800	Round	.315	.125	2.62	8,810	.0642
NIVME	4/0	211,600	Sector	.315	.125	2.49	8,640	.0509
NIVOP	...	250,000	Sector	.315	.125	2.58	9,290	.0431
NIVPO	...	300,000	Sector	.315	.135	2.70	10,420	.0360
NIVRY	...	350,000	Sector	.315	.135	2.79	11,240	.0308
NIVYR	...	400,000	Sector	.315	.135	2.88	12,020	.0270
NIWAM	...	500,000	Sector	.315	.140	3.05	13,870	.0216

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



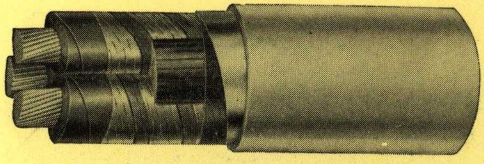
THREE CONDUCTOR—TYPE "H" 22,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIEWN	2	66,370	Round	.265	.110	1.99	5,200	.162
NIFAT	1	83,690	Round	.265	.115	2.09	5,870	.129
NIFEV	1/0	105,500	Round	.265	.115	2.18	6,370	.102
NIFOY	2/0	133,100	Round	.265	.115	2.28	6,920	.0811
NIFTA	3/0	167,800	Round	.265	.125	2.41	7,940	.0642
NIFUZ	4/0	211,600	Sector	.265	.115	2.27	7,530	.0509
NIFVE	...	250,000	Sector	.265	.125	2.38	8,450	.0431
NIFYO	...	300,000	Sector	.265	.125	2.48	9,260	.0360
NIGAV	...	350,000	Sector	.265	.125	2.57	10,040	.0308
NIGCY	...	400,000	Sector	.265	.135	2.68	11,130	.0270
NIGIX	...	500,000	Sector	.265	.135	2.84	12,570	.0216
NIGOZ	...	600,000	Sector	.265	.140	2.99	14,350	.0180

THREE CONDUCTOR—TYPE "H" 22,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIWEN	2	66,370	Round	.330	.115	2.28	6,430	.162
NIWUR	1	83,690	Round	.330	.125	2.39	7,200	.129
NIWYS	1/0	105,500	Round	.330	.125	2.48	7,760	.102
NIYAN	2/0	133,100	Round	.330	.125	2.57	8,350	.0811
NIYDZ	3/0	167,800	Round	.330	.135	2.71	9,430	.0642
NIYEP	4/0	211,600	Sector	.330	.125	2.55	8,880	.0509
NIYHD	...	250,000	Sector	.330	.125	2.64	9,540	.0431
NIYJF	...	300,000	Sector	.330	.135	2.76	10,690	.0360
NIYNA	...	350,000	Sector	.330	.135	2.85	11,500	.0308
NIYOR	...	400,000	Sector	.330	.135	2.94	12,300	.0270
NIYPE	...	500,000	Sector	.330	.140	3.11	14,150	.0216

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



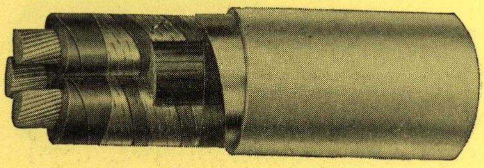
THREE CONDUCTOR—TYPE "H" 23,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIEWN	2	66,370	Round	.265	.110	1.99	5,200	.162
NIFAT	1	83,690	Round	.265	.115	2.09	5,870	.129
NIFEV	1/0	105,500	Round	.265	.115	2.18	6,370	.102
NIFOY	2/0	133,100	Round	.265	.115	2.28	6,920	.0811
NIFTA	3/0	167,800	Round	.265	.125	2.41	7,940	.0642
NIFUZ	4/0	211,600	Sector	.265	.115	2.27	7,530	.0509
NIFVE	...	250,000	Sector	.265	.125	2.38	8,450	.0431
NIFYO	...	300,000	Sector	.265	.125	2.48	9,260	.0360
NIGAV	...	350,000	Sector	.265	.125	2.57	10,040	.0308
NIGCY	...	400,000	Sector	.265	.135	2.68	11,130	.0270
NIGIX	...	500,000	Sector	.265	.135	2.84	12,570	.0216
NIGOZ	...	600,000	Sector	.265	.140	2.99	14,350	.0180

THREE CONDUCTOR—TYPE "H" 23,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIYRO	2	66,370	Round	.345	.125	2.37	6,990	.162
NIYTY	1	83,690	Round	.345	.125	2.47	7,510	.129
NIYUS	1/0	105,500	Round	.345	.125	2.55	8,010	.102
NIYXT	2/0	133,100	Round	.345	.125	2.64	8,610	.0811
NIZAP	3/0	167,800	Round	.345	.135	2.77	9,500	.0642
NIZIR	4/0	211,600	Sector	.345	.125	2.61	9,130	.0509
NIZOS	...	250,000	Sector	.345	.135	2.72	10,130	.0431
NIZPA	...	300,000	Sector	.345	.135	2.82	10,960	.0360
NIZSO	...	350,000	Sector	.345	.135	2.91	11,780	.0308
NIZUT	...	400,000	Sector	.345	.140	3.01	12,940	.0270
NIZVY	...	500,000	Sector	.345	.140	3.17	14,450	.0216

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



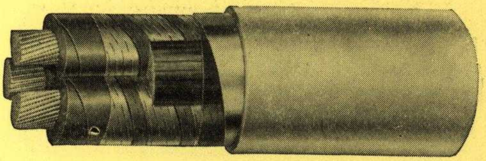
THREE CONDUCTOR—TYPE "H" (Grounded Neutral) 24,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIGUB	2	66,370	Round	.280	.115	2.07	5,660	.162
NIGVA	1	83,690	Round	.280	.115	2.15	6,090	.129
NIGWE	1/0	105,500	Round	.280	.115	2.24	6,570	.102
NIGZO	2/0	133,100	Round	.280	.125	2.36	7,500	.0811
NIHBO	3/0	167,800	Round	.280	.125	2.47	8,210	.0642
NIHIZ	4/0	211,600	Sector	.280	.115	2.33	7,750	.0509
NIHOB	...	250,000	Sector	.280	.125	2.44	8,710	.0431
NIHUC	...	300,000	Sector	.280	.125	2.54	9,510	.0360
NIHWA	...	350,000	Sector	.280	.125	2.63	10,280	.0308
NIHYE	...	400,000	Sector	.280	.135	2.74	11,390	.0270
NIJAY	...	500,000	Sector	.280	.135	2.90	12,850	.0216
NIJCO	...	600,000	Sector	.280	.140	3.05	14,640	.0180

THREE CONDUCTOR—TYPE "H" (Ungrounded Neutral) 24,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
NIYRO	2	66,370	Round	.345	.125	2.37	6,990	.162
NIYTY	1	83,690	Round	.345	.125	2.47	7,510	.129
NIYUS	1/0	105,500	Round	.345	.125	2.55	8,010	.102
NIYXT	2/0	133,100	Round	.345	.125	2.64	8,610	.0811
NIZAP	3/0	167,800	Round	.345	.135	2.77	9,500	.0642
NIZIR	4/0	211,600	Sector	.345	.125	2.61	9,130	.0509
NIZOS	...	250,000	Sector	.345	.135	2.72	10,130	.0431
NIZPA	...	300,000	Sector	.345	.135	2.82	10,960	.0360
NIZSO	...	350,000	Sector	.345	.135	2.91	11,780	.0308
NIZUT	...	400,000	Sector	.345	.140	3.01	12,940	.0270
NIZVY	...	500,000	Sector	.345	.140	3.17	14,450	.0216

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



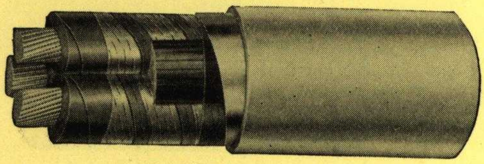
THREE CONDUCTOR—TYPE "H" 25,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIGUB	2	66,370	Round	.280	.115	2.07	5,660	.162
NIGVA	1	83,690	Round	.280	.115	2.15	6,090	.129
NIGWE	1/0	105,500	Round	.280	.115	2.24	6,570	.102
NIGZO	2/0	133,100	Round	.280	.125	2.36	7,500	.0811
NIHBO	3/0	167,800	Round	.280	.125	2.47	8,210	.0642
NIHIZ	4/0	211,600	Sector	.280	.115	2.33	7,750	.0509
NIHOB	...	250,000	Sector	.280	.125	2.44	8,710	.0431
NIHUC	...	300,000	Sector	.280	.125	2.54	9,510	.0360
NIHWA	...	350,000	Sector	.280	.125	2.63	10,280	.0308
NIHYE	...	400,000	Sector	.280	.135	2.74	11,390	.0270
NIJAY	...	500,000	Sector	.280	.135	2.90	12,850	.0216
NIJCO	...	600,000	Sector	.280	.140	3.05	14,640	.0180

THREE CONDUCTOR—TYPE "H" 25,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOADY	2	66,370	Round	.360	.125	2.44	7,250	.162
NOAJD	1	83,690	Round	.360	.125	2.52	7,740	.129
NOALG	1/0	105,500	Round	.360	.125	2.61	8,280	.102
NOANJ	2/0	133,100	Round	.360	.135	2.72	9,230	.0811
NOAPK	3/0	167,800	Round	.360	.135	2.84	9,990	.0642
NOARM	4/0	211,600	Sector	.360	.135	2.69	9,720	.0509
NOAWR	...	250,000	Sector	.360	.135	2.78	10,390	.0431
NOAZT	...	300,000	Sector	.360	.135	2.88	11,230	.0360
NOBAV	...	350,000	Sector	.360	.135	2.97	12,050	.0308
NOBIX	...	400,000	Sector	.360	.140	3.07	12,830	.0270

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



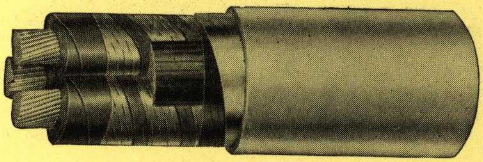
THREE CONDUCTOR—TYPE "H" (Grounded Neutral) 26,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIJEZ	2	66,370	Round	.295	.115	2.14	5,920	.162
NIJIB	1	83,690	Round	.295	.115	2.22	6,310	.129
NIJOC	1/0	105,500	Round	.295	.115	2.31	6,840	.102
NIJUD	2/0	133,100	Round	.295	.125	2.43	7,750	.0811
NIJYA	3/0	167,800	Round	.295	.125	2.54	8,460	.0642
NIJZE	4/0	211,600	Sector	.295	.125	2.41	8,310	.0509
NIKAZ	...	250,000	Sector	.295	.125	2.50	8,960	.0431
NIKBE	...	300,000	Sector	.295	.125	2.60	9,760	.0360
NIKDO	...	350,000	Sector	.295	.135	2.71	10,870	.0308
NIKEB	...	400,000	Sector	.295	.135	2.80	11,660	.0270
NIKIC	...	500,000	Sector	.295	.135	2.96	13,120	.0216
NIKOD	...	600,000	Sector	.295	.140	3.11	14,940	.0180

THREE CONDUCTOR—TYPE "H" (Ungrounded Neutral) 26,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOBVA	2	66,370	Round	.375	.125	2.50	7,530	.162
NOBWE	1	83,690	Round	.375	.125	2.59	8,000	.129
NOBZO	1/0	105,500	Round	.375	.135	2.70	8,880	.102
NOCBO	2/0	133,100	Round	.375	.135	2.78	9,490	.0811
NOCWA	3/0	167,800	Round	.375	.135	2.91	10,320	.0642
NOCYE	4/0	211,600	Sector	.375	.135	2.75	9,970	.0509
NODCO	...	250,000	Sector	.375	.135	2.84	10,660	.0431
NODYA	...	300,000	Sector	.375	.135	2.94	11,510	.0360
NODZE	...	350,000	Sector	.375	.140	3.04	12,700	.0308
NOECY	...	400,000	Sector	.375	.140	3.13	13,520	.0270

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



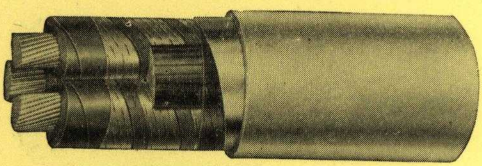
THREE CONDUCTOR—TYPE "H" (Grounded Neutral) 27,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIJEZ	2	66,370	Round	.295	.115	2.14	5,920	.162
NIJIB	1	83,690	Round	.295	.115	2.22	6,310	.129
NIJOC	1/0	105,500	Round	.295	.115	2.31	6,840	.102
NIJUD	2/0	133,100	Round	.295	.125	2.43	7,750	.0811
NIJYA	3/0	167,800	Round	.295	.125	2.54	8,460	.0642
NIJZE	4/0	211,600	Sector	.295	.125	2.41	8,310	.0509
NIKAZ	...	250,000	Sector	.295	.125	2.50	8,960	.0431
NIKBE	...	300,000	Sector	.295	.125	2.60	9,760	.0360
NIKDO	...	350,000	Sector	.295	.135	2.71	10,870	.0308
NIKEB	...	400,000	Sector	.295	.135	2.80	11,660	.0270
NIKIC	...	500,000	Sector	.295	.135	2.96	13,120	.0216
NIKOD	...	600,000	Sector	.295	.140	3.11	14,940	.0180

THREE CONDUCTOR—TYPE "H" (Ungrounded Neutral) 27,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOEDZ	2	66,370	Round	.390	.125	2.56	7,680	.162
NOEJF	1	83,690	Round	.390	.125	2.65	8,260	.129
NOENK	1/0	105,500	Round	.390	.135	2.76	9,150	.102
NOERN	2/0	133,100	Round	.390	.135	2.85	9,800	.0811
NOEWS	3/0	167,800	Round	.390	.135	2.97	10,600	.0642
NOEXT	4/0	211,600	Sector	.390	.135	2.81	10,240	.0509
NOFBE	...	250,000	Sector	.390	.135	2.90	10,930	.0431
NOFDO	...	300,000	Sector	.390	.140	3.01	12,150	.0360
NOFGY	...	350,000	Sector	.390	.140	3.10	12,980	.0308

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" 28,000 VOLTS

(Grounded Neutral)

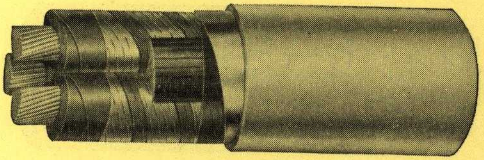
Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIKUF	1	83,690	Round	.315	.115	2.31	6,620	.129
NIKYG	1/0	105,500	Round	.315	.125	2.41	7,480	.102
NIKZA	2/0	133,100	Round	.315	.125	2.51	8,090	.0811
NILAB	3/0	167,800	Round	.315	.125	2.62	8,810	.0642
NILBA	4/0	211,600	Sector	.315	.125	2.49	8,640	.0509
NILCE	...	250,000	Sector	.315	.125	2.58	9,290	.0431
NILEC	...	300,000	Sector	.315	.135	2.70	10,420	.0360
NILFO	...	350,000	Sector	.315	.135	2.79	11,240	.0308
NILID	...	400,000	Sector	.315	.135	2.88	12,020	.0270
NILOF	...	500,000	Sector	.315	.140	3.05	13,870	.0216

THREE CONDUCTOR—TYPE "H" 28,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOFYG	1	83,690	Round	.405	.135	2.74	8,870	.129
NOFZA	1/0	105,500	Round	.405	.135	2.82	9,440	.102
NOGBA	2/0	133,100	Round	.405	.135	2.92	10,100	.0811
NOGCE	3/0	167,800	Round	.405	.140	3.04	11,250	.0642
NOGFO	4/0	211,600	Sector	.405	.135	2.87	10,510	.0509
NOGHY	...	250,000	Sector	.405	.135	2.96	11,190	.0431
NOGYH	...	300,000	Sector	.405	.140	3.07	12,370	.0360
NOHCA	...	350,000	Sector	.405	.140	3.16	13,280	.0308

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" 29,000 VOLTS

(Grounded Neutral)

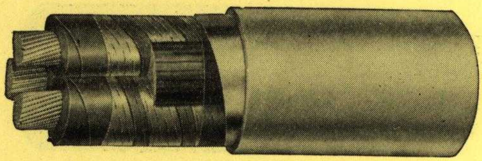
Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NILUG	1	83,690	Round	.330	.125	2.39	7,200	.129
NILYH	1/0	105,500	Round	.330	.125	2.48	7,760	.102
NIMAC	2/0	133,100	Round	.330	.125	2.57	8,350	.0811
NIMCA	3/0	167,800	Round	.330	.135	2.71	9,430	.0642
NIMDE	4/0	211,600	Sector	.330	.125	2.55	8,880	.0509
NIMED	...	250,000	Sector	.330	.125	2.64	9,540	.0431
NIMGO	...	300,000	Sector	.330	.135	2.76	10,690	.0360
NIMIF	...	350,000	Sector	.330	.135	2.85	11,500	.0308
NIMOG	...	400,000	Sector	.330	.135	2.94	12,300	.0270
NIMUH	...	500,000	Sector	.330	.140	3.11	14,150	.0216

THREE CONDUCTOR—TYPE "H" 29,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOHDE	1	83,690	Round	.420	.135	2.80	9,140	.129
NOHGO	1/0	105,500	Round	.420	.135	2.89	9,770	.102
NOHJY	2/0	133,100	Round	.420	.140	2.99	10,780	.0811
NOHYJ	3/0	167,800	Round	.420	.140	3.11	11,560	.0642
NOIBY	4/0	211,600	Sector	.420	.135	2.93	10,780	.0509
NOIGD	...	250,000	Sector	.420	.140	3.03	11,830	.0431
NOILJ	...	300,000	Sector	.420	.140	3.13	12,650	.0360

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" 30,000 VOLTS

(Grounded Neutral)

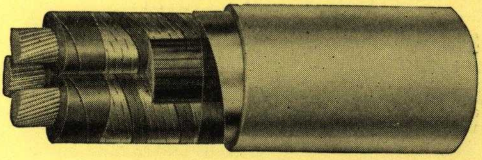
Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NILUG	1	83,690	Round	.330	.125	2.39	7,200	.129
NILYH	1/0	105,500	Round	.330	.125	2.48	7,760	.102
NIMAC	2/0	133,100	Round	.330	.125	2.57	8,350	.0811
NIMCA	3/0	167,800	Round	.330	.135	2.71	9,430	.0642
NIMDE	4/0	211,600	Sector	.330	.125	2.55	8,880	.0509
NIMED	...	250,000	Sector	.330	.125	2.64	9,540	.0431
NIMGO	...	300,000	Sector	.330	.135	2.76	10,690	.0360
NIMIF	...	350,000	Sector	.330	.135	2.85	11,500	.0308
NIMOG	...	400,000	Sector	.330	.135	2.94	12,300	.0270
NIMUH	...	500,000	Sector	.330	.140	3.11	14,150	.0216

THREE CONDUCTOR—TYPE "H" 30,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOHDE	1	83,690	Round	.420	.135	2.80	9,140	.129
NOHGO	1/0	105,500	Round	.420	.135	2.89	9,770	.102
NOHJY	2/0	133,100	Round	.420	.140	2.99	10,780	.0811
NOHYJ	3/0	167,800	Round	.420	.140	3.11	11,560	.0642
NOIBY	4/0	211,600	Sector	.420	.135	2.93	10,780	.0509
NOIGD	...	250,000	Sector	.420	.140	3.03	11,830	.0431
NOILJ	...	300,000	Sector	.420	.140	3.13	12,650	.0360

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" 31,000 VOLTS

(Grounded Neutral)

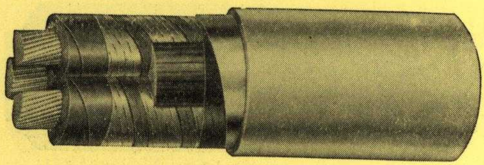
Code	Conductor Size B. & S.	Conductor Size C.M	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000'	Average Resistance Ohms/ 1,000' @ 25°C.
NIMYJ	1/0	105,500	Round	.345	.125	2.55	8,010	.102
NINAD	2/0	133,100	Round	.345	.125	2.64	8,610	.0811
NINDA	3/0	167,800	Round	.345	.135	2.77	9,500	.0642
NINEF	4/0	211,600	Sector	.345	.125	2.61	9,130	.0509
NINFE	...	250,000	Sector	.345	.135	2.72	10,130	.0431
NINHO	...	300,000	Sector	.345	.135	2.82	10,960	.0360
NINIG	...	350,000	Sector	.345	.135	2.91	11,780	.0308
NINKY	...	400,000	Sector	.345	.140	3.01	12,940	.0270
NINOH	...	500,000	Sector	.345	.140	3.17	14,450	.0216

THREE CONDUCTOR—TYPE "H" 31,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000'	Average Resistance Ohms/ 1,000' @ 25°C.
NOIRP	1/0	105,500	Round	.440	.140	2.99	10,550	.102
NOJDA	2/0	133,100	Round	.440	.140	3.08	11,190	.0811
NOJFE	3/0	167,800	Round	.440	.140	3.19	11,990	.0642
NOJHO	4/0	211,600	Sector	.440	.140	3.02	11,510	.0509
NOJKY	...	250,000	Sector	.440	.140	3.11	12,600	.0431

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" — 32,000 VOLTS

(Grounded Neutral)

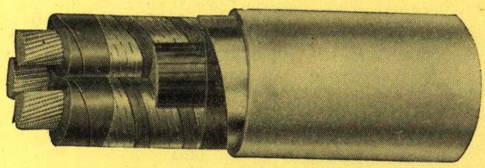
Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NIMYJ	1/0	105,500	Round	.345	.125	2.55	8,010	.102
NINAD	2/0	133,100	Round	.345	.125	2.64	8,610	.0811
NINDA	3/0	167,800	Round	.345	.135	2.77	9,500	.0642
NINEF	4/0	211,600	Sector	.345	.125	2.61	9,130	.0509
NINFE	...	250,000	Sector	.345	.135	2.72	10,130	.0431
NINHO	...	300,000	Sector	.345	.135	2.82	10,960	.0360
NINIG	...	350,000	Sector	.345	.135	2.91	11,780	.0308
NINKY	...	400,000	Sector	.345	.140	3.01	12,940	.0270
NINOH	...	500,000	Sector	.345	.140	3.17	14,450	.0216

THREE CONDUCTOR—TYPE "H" — 32,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOIRP	1/0	105,500	Round	.440	.140	2.99	10,550	.102
NOJDA	2/0	133,100	Round	.440	.140	3.08	11,190	.0811
NOJFE	3/0	167,800	Round	.440	.140	3.19	11,990	.0642
NOJHO	4/0	211,600	Sector	.440	.140	3.02	11,510	.0509
NOJKY	...	250,000	Sector	.440	.140	3.11	12,600	.0431

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type



THREE CONDUCTOR—TYPE "H" 33,000 VOLTS

(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NINUJ	1/0	105,500	Round	.360	.125	2.61	8,280	.102
NINYK	2/0	133,100	Round	.360	.135	2.72	9,230	.0811
NIOBT	3/0	167,800	Round	.360	.135	2.84	9,990	.0642
NIOFY	4/0	211,600	Sector	.360	.135	2.69	9,720	.0509
NIOGZ	...	250,000	Sector	.360	.135	2.78	10,390	.0431
NIOHB	...	300,000	Sector	.360	.135	2.88	11,230	.0360
NIOKD	...	350,000	Sector	.360	.135	2.97	12,050	.0308
NIOLF	...	400,000	Sector	.360	.140	3.07	12,830	.0270

THREE CONDUCTOR—TYPE "H" 33,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
NOJYK	1/0	105,500	Round	.455	.140	3.05	10,800	.102
NOKFA	2/0	133,100	Round	.455	.140	3.14	11,480	.0811
NOKGE	3/0	167,800	Round	.455	.140	3.26	12,330	.0642
NOKJO	4/0	211,600	Sector	.455	.140	3.08	11,800	.0509
NOKLY	...	250,000	Sector	.455	.140	3.17	12,510	.0431

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED — 1,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LUWUL	8	16,510	Round	.065	.030	.085	.90	1,520	.654
LUYAH	6	26,250	Round	.065	.030	.085	.99	1,810	.410
LUYDS	4	41,740	Round	.065	.030	.095	1.13	2,370	.259
LUYHA	2	66,370	Sector	.065	.030	.095	1.16	2,670	.162
LUYIK	1	83,690	Sector	.065	.030	.095	1.24	3,030	.129
LUYJE	1/0	105,500	Sector	.065	.030	.095	1.33	3,470	.102
LUYLO	2/0	133,100	Sector	.065	.030	.100	1.44	4,170	.0811
LUYOL	3/0	167,800	Sector	.065	.030	.100	1.56	4,850	.0642
LUYPF	4/0	211,600	Sector	.065	.030	.100	1.69	5,660	.0509
LUYUM	...	250,000	Sector	.080	.030	.110	1.87	6,790	.0431
LUZAJ	...	300,000	Sector	.080	.030	.110	1.99	7,680	.0360
LUZEK	...	350,000	Sector	.080	.030	.115	2.11	8,810	.0308
LUZIL	...	400,000	Sector	.080	.030	.115	2.21	9,690	.0270
LUZJA	...	500,000	Sector	.080	.030	.125	2.42	11,680	.0216
LUZKE	...	600,000	Sector	.080	.030	.125	2.60	13,390	.0180
LUZMO	...	750,000	Sector	.080	.030	.135	2.85	16,220	.0144
LUZYP	...	1,000,000	Sector	.080	.045	.140	3.23	20,790	.0108

FOUR CONDUCTOR—BELTED — 2,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYADY	8	16,510	Round	.080	.030	.085	.97	1,670	.654
LYAJP	6	26,250	Round	.080	.030	.085	1.06	1,960	.410
LYALG	4	41,740	Round	.080	.030	.095	1.20	2,530	.259
LYANJ	2	66,370	Sector	.080	.030	.095	1.22	2,820	.162
LYAPK	1	83,690	Sector	.080	.030	.095	1.30	3,180	.129
LYARM	1/0	105,500	Sector	.080	.030	.095	1.39	3,630	.102
LYAWR	2/0	133,100	Sector	.080	.030	.100	1.50	4,350	.0811
LYAZT	3/0	167,800	Sector	.080	.030	.100	1.60	5,010	.0642
LYBAV	4/0	211,600	Sector	.080	.030	.110	1.77	6,080	.0509
LYBIX	...	250,000	Sector	.080	.045	.110	1.90	6,890	.0431
LYBJY	...	300,000	Sector	.080	.045	.110	2.02	7,790	.0360
LYBOZ	...	350,000	Sector	.080	.045	.115	2.14	8,920	.0308
LYBUB	...	400,000	Sector	.080	.045	.115	2.24	9,800	.0270
LYBVA	...	500,000	Sector	.080	.045	.125	2.45	11,800	.0216
LYBWE	...	600,000	Sector	.080	.045	.125	2.63	13,520	.0180
LYBZO	...	750,000	Sector	.080	.045	.135	2.88	16,360	.0144
LYCBO	...	1,000,000	Sector	.080	.045	.140	3.23	20,790	.0108

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYCIZ	8	16,510	Round	.080	.045	.085	1.00	1,740	.654
LYCKY	6	26,250	Round	.080	.045	.095	1.11	2,170	.410
LYCOB	4	41,740	Round	.080	.045	.095	1.23	2,610	.259
LYCUC	2	66,370	Sector	.080	.045	.095	1.25	2,890	.162
LYCWA	1	83,690	Sector	.080	.045	.095	1.33	3,260	.129
LYCYE	1/0	105,500	Sector	.080	.045	.100	1.43	3,880	.102
LYDAY	2/0	133,100	Sector	.080	.045	.100	1.53	4,440	.0811
LYDCO	3/0	167,800	Sector	.080	.045	.100	1.65	5,130	.0642
LYDEZ	4/0	211,600	Sector	.080	.045	.110	1.80	6,170	.0509
LYDIB	...	250,000	Sector	.080	.045	.110	1.90	6,890	.0431
LYDOC	...	300,000	Sector	.080	.045	.110	2.02	7,790	.0360
LYDUD	...	350,000	Sector	.080	.045	.115	2.14	8,920	.0308
LYDYA	...	400,000	Sector	.080	.045	.115	2.24	9,800	.0270
LYDZE	...	500,000	Sector	.080	.045	.125	2.45	11,800	.0216
LYECY	...	600,000	Sector	.080	.045	.125	2.63	13,520	.0180
LYEDZ	...	750,000	Sector	.080	.045	.135	2.88	16,360	.0144
LYEJF	...	1,000,000	Sector	.080	.045	.140	3.23	20,790	.0108

FOUR CONDUCTOR—BELTED (Grounded or Ungrounded Neutral) 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYENK	8	16,510	Round	.095	.045	.085	1.07	1,890	.654
LYERN	6	26,250	Round	.095	.045	.095	1.19	2,350	.410
LYEWS	4	41,740	Round	.095	.045	.095	1.30	2,790	.259
LYEXT	2	66,370	Sector	.095	.045	.095	1.31	3,050	.162
LYFAZ	1	83,690	Sector	.095	.045	.095	1.39	3,430	.129
LYFBE	1/0	105,500	Sector	.095	.045	.100	1.49	4,060	.102
LYFDO	2/0	133,100	Sector	.095	.045	.100	1.59	4,620	.0811
LYFEB	3/0	167,800	Sector	.095	.045	.110	1.73	5,540	.0642
LYFIC	4/0	211,600	Sector	.095	.045	.110	1.86	6,380	.0509
LYFMY	...	250,000	Sector	.095	.045	.110	1.96	7,100	.0431
LYFOD	...	300,000	Sector	.095	.045	.115	2.09	8,270	.0360
LYFUF	...	350,000	Sector	.095	.045	.115	2.20	9,150	.0308
LYFYM	...	400,000	Sector	.095	.045	.115	2.30	10,040	.0270
LYFZA	...	500,000	Sector	.095	.045	.125	2.51	12,060	.0216
LYGAB	...	600,000	Sector	.095	.045	.135	2.71	14,120	.0180
LYGBA	...	750,000	Sector	.095	.045	.135	2.94	16,660	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED — 5,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYGCE	8	16,510	Round	.095	.065	.095	1.13	2,120	.654
LYGEC	6	26,250	Round	.095	.065	.095	1.23	2,450	.410
LYGFO	4	41,740	Round	.095	.065	.095	1.34	2,890	.259
LYGID	2	66,370	Sector	.095	.065	.095	1.35	3,150	.162
LYGNY	1	83,690	Sector	.095	.065	.100	1.44	3,710	.129
LYGOF	1/0	105,500	Sector	.095	.065	.100	1.53	4,180	.102
LYGUG	2/0	133,100	Sector	.095	.065	.100	1.63	4,740	.0811
LYGYN	3/0	167,800	Sector	.095	.065	.110	1.77	5,670	.0642
LYHAC	4/0	211,600	Sector	.095	.065	.110	1.90	6,520	.0509
LYHCA	...	250,000	Sector	.095	.065	.110	2.00	7,250	.0431
LYHDE	...	300,000	Sector	.095	.065	.115	2.13	8,410	.0360
LYHED	...	350,000	Sector	.095	.065	.115	2.24	9,300	.0308
LYHGO	...	400,000	Sector	.095	.065	.125	2.36	10,520	.0270
LYHIF	...	500,000	Sector	.095	.065	.125	2.55	12,230	.0216
LYHOG	...	600,000	Sector	.095	.065	.135	2.75	14,310	.0180
LYHPY	...	750,000	Sector	.095	.065	.140	2.99	17,220	.0144

FOUR CONDUCTOR—BELTED — 6,000 VOLTS
(Grounded or Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYGCE	8	16,510	Round	.095	.065	.095	1.13	2,120	.654
LYGEC	6	26,250	Round	.095	.065	.095	1.23	2,450	.410
LYGFO	4	41,740	Round	.095	.065	.095	1.34	2,890	.259
LYGID	2	66,370	Sector	.095	.065	.095	1.35	3,150	.162
LYGNY	1	83,690	Sector	.095	.065	.100	1.44	3,710	.129
LYGOF	1/0	105,500	Sector	.095	.065	.100	1.53	4,180	.102
LYGUG	2/0	133,100	Sector	.095	.065	.100	1.63	4,740	.0811
LYGYN	3/0	167,800	Sector	.095	.065	.110	1.77	5,670	.0642
LYHAC	4/0	211,600	Sector	.095	.065	.110	1.90	6,520	.0509
LYHCA	...	250,000	Sector	.095	.065	.110	2.00	7,250	.0431
LYHDE	...	300,000	Sector	.095	.065	.115	2.13	8,410	.0360
LYHED	...	350,000	Sector	.095	.065	.115	2.24	9,300	.0308
LYHGO	...	400,000	Sector	.095	.065	.125	2.36	10,520	.0270
LYHIF	...	500,000	Sector	.095	.065	.125	2.55	12,230	.0216
LYHOG	...	600,000	Sector	.095	.065	.135	2.75	14,310	.0180
LYHPY	...	750,000	Sector	.095	.065	.140	2.99	17,220	.0144

PAPER INSULATED—LEAD SHEATHED CABLE

Compound-Filled Type

FOUR CONDUCTOR—BELTED (Grounded Neutral) — 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LYHUH	8	16,510	Round	.110	.065	.095	1.21	2,310	.654
LYHYP	6	26,250	Round	.110	.065	.095	1.30	2,630	.410
LYIBY	4	41,740	Round	.110	.065	.100	1.42	3,240	.259
LYIGD	2	66,370	Sector	.110	.065	.100	1.42	3,490	.162
LYILJ	1	83,690	Sector	.110	.065	.100	1.50	3,880	.129
LYIRP	1/0	105,500	Sector	.110	.065	.100	1.59	4,370	.102
LYJAD	2/0	133,100	Sector	.110	.065	.100	1.69	4,940	.0811
LYJDA	3/0	167,800	Sector	.110	.065	.110	1.83	5,870	.0642
LYJEF	4/0	211,600	Sector	.110	.065	.110	1.95	6,720	.0509
LYJFE	...	250,000	Sector	.110	.065	.115	2.07	7,720	.0431
LYJHO	...	300,000	Sector	.110	.065	.115	2.19	8,640	.0360
LYJIG	...	350,000	Sector	.110	.065	.115	2.30	9,530	.0308
LYJOH	...	400,000	Sector	.110	.065	.125	2.42	10,770	.0270
LYJUJ	...	500,000	Sector	.110	.065	.125	2.61	12,510	.0216
LYKAF	...	600,000	Sector	.110	.065	.135	2.81	14,580	.0180
LYKEG	...	750,000	Sector	.110	.065	.140	3.05	17,520	.0144

FOUR CONDUCTOR—BELTED (Ungrounded Neutral) — 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LYSPE	8	16,510	Round	.110	.095	.095	1.27	2,460	.654
LYSRO	6	26,250	Round	.110	.095	.095	1.36	2,790	.410
LYSUS	4	41,740	Round	.110	.095	.100	1.48	3,420	.259
LYSYB	2	66,370	Sector	.110	.095	.100	1.48	3,660	.162
LYTAP	1	83,690	Sector	.110	.095	.100	1.56	4,060	.129
LYTIR	1/0	105,500	Sector	.110	.095	.100	1.65	4,550	.102
LYTOS	2/0	133,100	Sector	.110	.095	.110	1.78	5,370	.0811
LYTPA	3/0	167,800	Sector	.110	.095	.110	1.89	6,080	.0642
LYTSO	4/0	211,600	Sector	.110	.095	.110	2.01	6,930	.0509
LYTUT	...	250,000	Sector	.110	.095	.115	2.13	7,940	.0431
LYTYC	...	300,000	Sector	.110	.095	.115	2.25	8,870	.0360
LYUXY	...	350,000	Sector	.110	.095	.125	2.38	10,090	.0308
LYVER	...	400,000	Sector	.110	.095	.125	2.48	11,020	.0270
LYVRE	...	500,000	Sector	.110	.095	.135	2.69	13,100	.0216
LYVTO	...	600,000	Sector	.110	.095	.135	2.86	14,840	.0180
LYVUV	...	750,000	Sector	.110	.095	.140	3.11	17,830	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED — 8,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYHYP	6	26,250	Round	.110	.065	.095	1.30	2,630	.410
LYIBY	4	41,740	Round	.110	.065	.100	1.42	3,240	.259
LYIGD	2	66,370	Sector	.110	.065	.100	1.42	3,490	.162
LYILJ	1	83,690	Sector	.110	.065	.100	1.50	3,880	.129
LYIRP	1/0	105,500	Sector	.110	.065	.100	1.59	4,370	.102
LYJAD	2/0	133,100	Sector	.110	.065	.100	1.69	4,940	.0811
LYJDA	3/0	167,800	Sector	.110	.065	.110	1.83	5,870	.0642
LYJEF	4/0	211,600	Sector	.110	.065	.110	1.95	6,720	.0509
LYJFE	...	250,000	Sector	.110	.065	.115	2.07	7,720	.0431
LYJHO	...	300,000	Sector	.110	.065	.115	2.19	8,640	.0360
LYJIG	...	350,000	Sector	.110	.065	.115	2.30	9,530	.0308
LYJOH	...	400,000	Sector	.110	.065	.125	2.42	10,770	.0270
LYJUJ	...	500,000	Sector	.110	.065	.125	2.61	12,510	.0216
LYKAF	...	600,000	Sector	.110	.065	.135	2.81	14,580	.0180
LYKEG	...	750,000	Sector	.110	.065	.140	3.05	17,520	.0144

FOUR CONDUCTOR—BELTED — 8,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYVYD	6	26,250	Round	.110	.110	.095	1.39	2,860	.410
LYWAR	4	41,740	Round	.110	.110	.100	1.51	3,500	.259
LYWIT	2	66,370	Sector	.110	.110	.100	1.51	3,740	.162
LYWOV	1	83,690	Sector	.110	.110	.100	1.59	4,150	.129
LYWRA	1/0	105,500	Sector	.110	.110	.100	1.68	4,640	.102
LYWYF	2/0	133,100	Sector	.110	.110	.110	1.80	5,450	.0811
LYZAT	3/0	167,800	Sector	.110	.110	.110	1.92	6,180	.0642
LYZEV	4/0	211,600	Sector	.110	.110	.115	2.06	7,300	.0509
LYZOY	...	250,000	Sector	.110	.110	.115	2.16	8,040	.0431
LYZTA	...	300,000	Sector	.110	.110	.115	2.28	8,980	.0360
LYZUZ	...	350,000	Sector	.110	.110	.125	2.41	10,220	.0308
LYZVE	...	400,000	Sector	.110	.110	.125	2.51	11,150	.0270
LYZYO	...	500,000	Sector	.110	.110	.135	2.72	13,230	.0216
MAAKS	...	600,000	Sector	.110	.110	.135	2.90	15,000	.0180
MAALT	...	750,000	Sector	.110	.110	.140	3.14	17,980	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED 9,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LYKFA	6	26,250	Round	.125	.065	.095	1.37	2,810	.410
LYKGE	4	41,740	Round	.125	.065	.100	1.50	3,460	.259
LYKJO	2	66,370	Round	.125	.065	.100	1.64	4,130	.162
LYKOJ	1	83,690	Round	.125	.065	.110	1.76	4,810	.129
LYKRY	1/0	105,500	Round	.125	.065	.110	1.86	5,360	.102
LYKUK	2/0	133,100	Sector	.125	.065	.110	1.77	5,350	.0811
LYKYR	3/0	167,800	Sector	.125	.065	.110	1.89	6,090	.0642
LYLAG	4/0	211,600	Sector	.125	.065	.110	2.02	6,950	.0509
LYLGA	...	250,000	Sector	.125	.065	.115	2.13	7,940	.0431
LYLHE	...	300,000	Sector	.125	.065	.115	2.25	8,870	.0360
LYLIJ	...	350,000	Sector	.125	.065	.125	2.38	10,110	.0308
LYLKO	...	400,000	Sector	.125	.065	.125	2.48	11,030	.0270
LYLOK	...	500,000	Sector	.125	.065	.135	2.69	13,100	.0216
LYLSY	...	600,000	Sector	.125	.065	.135	2.87	14,888	.0180
LYLUL	...	750,000	Sector	.125	.065	.140	3.11	17,830	.0144

FOUR CONDUCTOR—BELTED 9,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
MAAMV	6	26,250	Round	.125	.125	.100	1.50	3,310	.410
MAAPY	4	41,740	Round	.125	.125	.100	1.62	3,820	.259
MAARB	2	66,370	Round	.125	.125	.110	1.78	4,720	.162
MAASC	1	83,690	Round	.125	.125	.110	1.88	5,210	.129
MAAWG	1/0	105,500	Round	.125	.125	.110	1.98	5,780	.102
MABAK	2/0	133,100	Sector	.125	.125	.110	1.89	5,750	.0811
MABKA	3/0	167,800	Sector	.125	.125	.110	2.01	6,510	.0642
MABLE	4/0	211,600	Sector	.125	.125	.115	2.15	7,640	.0509
MABNO	...	250,000	Sector	.125	.125	.115	2.25	8,390	.0431
MABON	...	300,000	Sector	.125	.125	.125	2.39	9,660	.0360
MABUP	...	350,000	Sector	.125	.125	.125	2.50	10,610	.0308
MACAL	...	400,000	Sector	.125	.125	.125	2.60	11,550	.0270
MACEM	...	500,000	Sector	.125	.125	.135	2.81	13,650	.0216
MACLA	...	600,000	Sector	.125	.125	.140	3.00	15,820	.0180
MACOP	...	750,000	Sector	.125	.125	.140	3.23	18,450	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED (Grounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYKFA	6	26,250	Round	.125	.065	.095	1.37	2,810	.410
LYKGE	4	41,740	Round	.125	.065	.100	1.50	3,460	.259
LYKJO	2	66,370	Round	.125	.065	.100	1.64	4,130	.162
LYKOJ	1	83,690	Round	.125	.065	.110	1.76	4,810	.129
LYKRY	1/0	105,500	Round	.125	.065	.110	1.86	5,360	.102
LYKUK	2/0	133,100	Sector	.125	.065	.110	1.77	5,350	.0811
LYKYR	3/0	167,800	Sector	.125	.065	.110	1.89	6,090	.0642
LYLAG	4/0	211,600	Sector	.125	.065	.110	2.02	6,950	.0509
LYLGA	...	250,000	Sector	.125	.065	.115	2.13	7,940	.0431
LYLHE	...	300,000	Sector	.125	.065	.115	2.25	8,870	.0360
LYLIJ	...	350,000	Sector	.125	.065	.125	2.38	10,110	.0308
LYLKO	...	400,000	Sector	.125	.065	.125	2.48	11,030	.0270
LYLOK	...	500,000	Sector	.125	.065	.135	2.69	13,100	.0216
LYLSY	...	600,000	Sector	.125	.065	.135	2.87	14,888	.0180
LYLUL	...	750,000	Sector	.125	.065	.140	3.11	17,830	.0144

FOUR CONDUCTOR—BELTED (Ungrounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
MAAMV	6	26,250	Round	.125	.125	.100	1.50	3,310	.410
MAAPY	4	41,740	Round	.125	.125	.100	1.62	3,820	.259
MAARB	2	66,370	Round	.125	.125	.110	1.78	4,720	.162
MAASC	1	83,690	Round	.125	.125	.110	1.88	5,210	.129
MAAWG	1/0	105,500	Round	.125	.125	.110	1.98	5,780	.102
MABAK	2/0	133,100	Sector	.125	.125	.110	1.89	5,750	.0811
MABKA	3/0	167,800	Sector	.125	.125	.110	2.01	6,510	.0642
MABLE	4/0	211,600	Sector	.125	.125	.115	2.15	7,640	.0509
MABNO	...	250,000	Sector	.125	.125	.115	2.25	8,390	.0431
MABON	...	300,000	Sector	.125	.125	.125	2.39	9,660	.0360
MABUP	...	350,000	Sector	.125	.125	.125	2.50	10,610	.0308
MACAL	...	400,000	Sector	.125	.125	.125	2.60	11,550	.0270
MACEM	...	500,000	Sector	.125	.125	.135	2.81	13,650	.0216
MACLA	...	600,000	Sector	.125	.125	.140	3.00	15,820	.0180
MACOP	...	750,000	Sector	.125	.125	.140	3.23	18,450	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED 11,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYLYS	6	26,250	Round	.125	.080	.100	1.41	3,060	.410
LYMAH	4	41,740	Round	.125	.080	.100	1.53	3,550	.259
LYMHA	2	66,370	Round	.125	.080	.100	1.67	4,210	.162
LYMIK	1	83,690	Round	.125	.080	.110	1.79	4,910	.129
LYMJE	1/0	105,500	Round	.125	.080	.110	1.89	5,460	.102
LYMLO	2/0	133,100	Sector	.125	.080	.110	1.80	5,450	.0811
LYMOL	3/0	167,800	Sector	.125	.080	.110	1.92	6,190	.0642
LYMTY	4/0	211,600	Sector	.125	.080	.115	2.06	7,310	.0509
LYMUM	...	250,000	Sector	.125	.080	.115	2.16	8,050	.0431
LYMYT	...	300,000	Sector	.125	.080	.115	2.28	8,980	.0360
LYNAJ	...	350,000	Sector	.125	.080	.125	2.41	10,230	.0308
LYNEK	...	400,000	Sector	.125	.080	.125	2.51	11,160	.0270
LYNIL	...	500,000	Sector	.125	.080	.135	2.72	13,240	.0216
LYNJA	...	600,000	Sector	.125	.080	.135	2.90	15,020	.0180
LYNKE	...	750,000	Sector	.125	.080	.140	3.14	17,990	.0144

FOUR CONDUCTOR—BELTED 11,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
MAAMV	6	26,250	Round	.125	.125	.100	1.50	3,310	.410
MAAPY	4	41,740	Round	.125	.125	.100	1.62	3,820	.259
MAARB	2	66,370	Round	.125	.125	.110	1.78	4,720	.162
MAASC	1	83,690	Round	.125	.125	.110	1.88	5,210	.129
MAAWG	1/0	105,500	Round	.125	.125	.110	1.98	5,780	.102
MABAK	2/0	133,100	Sector	.125	.125	.110	1.89	5,750	.0811
MABKA	3/0	167,800	Sector	.125	.125	.110	2.01	6,510	.0642
MABLE	4/0	211,600	Sector	.125	.125	.115	2.15	7,640	.0509
MABNO	...	250,000	Sector	.125	.125	.115	2.25	8,390	.0431
MABON	...	300,000	Sector	.125	.125	.125	2.39	9,660	.0360
MABUP	...	350,000	Sector	.125	.125	.125	2.50	10,610	.0308
MACAL	...	400,000	Sector	.125	.125	.125	2.60	11,550	.0270
MACEM	...	500,000	Sector	.125	.125	.135	2.81	13,650	.0216
MACLA	...	600,000	Sector	.125	.125	.140	3.00	15,820	.0180
MACOP	...	750,000	Sector	.125	.125	.140	3.23	18,450	.0144

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED (Grounded Neutral) 12,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C
LYNMO	6	26,250	Round	.140	.080	.100	1.48	3,250	.410
LYNVY	4	41,740	Round	.140	.080	.100	1.60	3,750	.259
LYNYV	2	66,370	Round	.140	.080	.110	1.76	4,650	.162
LYOBZ	1	83,690	Round	.140	.080	.110	1.86	5,130	.129
LYOFD	1/0	105,500	Round	.140	.080	.110	1.96	5,690	.102
LYOHG	2/0	133,100	Sector	.140	.080	.110	1.86	5,660	.0811
LYOLK	3/0	167,800	Sector	.140	.080	.110	1.98	6,410	.0642
LYOVT	4/0	211,600	Sector	.140	.080	.115	2.12	7,510	.0509
LYOZY	...	250,000	Sector	.140	.080	.115	2.22	8,290	.0431
LYPAK	...	300,000	Sector	.140	.080	.125	2.36	9,540	.0360
LYPEL	...	350,000	Sector	.140	.080	.125	2.47	10,490	.0308
LYPKA	...	400,000	Sector	.140	.080	.125	2.57	11,420	.0270
LYPLE	...	500,000	Sector	.140	.080	.135	2.78	13,530	.0216
LYPNO	...	600,000	Sector	.140	.080	.135	2.96	15,290	.0180

FOUR CONDUCTOR—BELTED (Ungrounded Neutral) 12,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
MACPO	6	26,250	Round	.140	.140	.100	1.60	3,610	.410
MACRY	4	41,740	Round	.140	.140	.110	1.74	4,340	.259
MACYR	2	66,370	Round	.140	.140	.110	1.88	5,050	.162
MADEN	1	83,690	Round	.140	.140	.110	1.98	5,550	.129
MADIP	1/0	105,500	Round	.140	.140	.115	2.09	6,370	.102
MADMA	2/0	133,100	Sector	.140	.140	.110	1.98	6,080	.0811
MADNE	3/0	167,800	Sector	.140	.140	.115	2.11	7,080	.0642
MADSY	4/0	211,600	Sector	.140	.140	.115	2.24	7,980	.0509
MADUR	...	250,000	Sector	.140	.140	.125	2.36	9,060	.0431
MADYS	...	300,000	Sector	.140	.140	.125	2.48	10,040	.0360
MAEJS	...	350,000	Sector	.140	.140	.125	2.59	11,000	.0308
MAEKT	...	400,000	Sector	.140	.140	.135	2.71	12,280	.0270
MAEIV	...	500,000	Sector	.140	.140	.135	2.90	13,890	.0216
MAENY	...	600,000	Sector	.140	.140	.140	3.09	16,270	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED 13,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYNMO	6	26,250	Round	.140	.080	.100	1.48	3,250	.410
LYNVY	4	41,740	Round	.140	.080	.100	1.60	3,750	.259
LYNYV	2	66,370	Round	.140	.080	.110	1.76	4,650	.162
LYOBZ	1	83,690	Round	.140	.080	.110	1.86	5,130	.129
LYOFD	1/0	105,500	Round	.140	.080	.110	1.96	5,690	.102
LYOHG	2/0	133,100	Sector	.140	.080	.110	1.86	5,660	.0811
LYOLK	3/0	167,800	Sector	.140	.080	.110	1.98	6,410	.0642
LYOVT	4/0	211,600	Sector	.140	.080	.115	2.12	7,510	.0509
LYOZY	...	250,000	Sector	.140	.080	.115	2.22	8,290	.0431
LYPAK	...	300,000	Sector	.140	.080	.125	2.36	9,540	.0360
LYPEL	...	350,000	Sector	.140	.080	.125	2.47	10,490	.0308
LYPKA	...	400,000	Sector	.140	.080	.125	2.57	11,420	.0270
LYPLE	...	500,000	Sector	.140	.080	.135	2.78	13,530	.0216
LYPNO	...	600,000	Sector	.140	.080	.135	2.96	15,290	.0180

FOUR CONDUCTOR—BELTED 13,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
MACPO	6	26,250	Round	.140	.140	.100	1.60	3,610	.410
MACRY	4	41,740	Round	.140	.140	.110	1.74	4,340	.259
MACYR	2	66,370	Round	.140	.140	.110	1.88	5,050	.162
MADEN	1	83,690	Round	.140	.140	.110	1.98	5,550	.129
MADIP	1/0	105,500	Round	.140	.140	.115	2.09	6,370	.102
MADMA	2/0	133,100	Sector	.140	.140	.110	1.98	6,080	.0811
MADNE	3/0	167,800	Sector	.140	.140	.115	2.11	7,080	.0642
MADSY	4/0	211,600	Sector	.140	.140	.115	2.24	7,980	.0509
MADUR	...	250,000	Sector	.140	.140	.125	2.36	9,060	.0431
MADYS	...	300,000	Sector	.140	.140	.125	2.48	10,040	.0360
MAEJS	...	350,000	Sector	.140	.140	.125	2.59	11,000	.0308
MAEKT	...	400,000	Sector	.140	.140	.135	2.71	12,280	.0270
MAEIV	...	500,000	Sector	.140	.140	.135	2.90	13,890	.0216
MAENY	...	600,000	Sector	.140	.140	.140	3.09	16,270	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED 14,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
LYPON	6	26,250	Round	.155	.080	.100	1.56	3,470	.410
LYPUP	4	41,740	Round	.155	.080	.100	1.67	3,960	.259
LYPWY	2	66,370	Round	.155	.080	.110	1.83	4,880	.162
LYRAM	1	83,690	Round	.155	.080	.110	1.93	5,380	.129
LYREN	1/0	105,500	Round	.155	.080	.115	2.04	6,190	.102
LYRIP	2/0	133,100	Sector	.155	.080	.110	1.92	5,880	.0811
LYRMA	3/0	167,800	Sector	.155	.080	.115	2.04	6,880	.0642
LYRNE	4/0	211,600	Sector	.155	.080	.115	2.17	7,760	.0509
LYRUR	...	250,000	Sector	.155	.080	.115	2.28	8,520	.0431
LYRYZ	...	300,000	Sector	.155	.080	.125	2.42	9,810	.0360
LYSAN	...	350,000	Sector	.155	.080	.125	2.53	10,760	.0308
LYSEP	...	400,000	Sector	.155	.080	.125	2.63	11,700	.0270
LYSNA	...	500,000	Sector	.155	.080	.135	2.84	13,820	.0216
LYSOR	...	600,000	Sector	.155	.080	.140	3.03	15,990	.0180

FOUR CONDUCTOR—BELTED 14,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
MAEPZ	6	26,250	Round	.155	.155	.110	1.73	4,140	.410
MAERC	4	41,740	Round	.155	.155	.110	1.84	4,660	.259
MAEVG	2	66,370	Round	.155	.155	.110	1.98	5,390	.162
MAEZK	1	83,690	Round	.155	.155	.115	2.09	6,160	.129
MAFAN	1/0	105,500	Round	.155	.155	.115	2.19	6,840	.102
MAFEP	2/0	133,100	Sector	.155	.155	.115	2.08	6,660	.0811
MAFNA	3/0	167,800	Sector	.155	.155	.115	2.20	7,430	.0642
MAFOR	4/0	211,600	Sector	.155	.155	.115	2.33	8,330	.0509
MAFPE	...	250,000	Sector	.155	.155	.125	2.45	9,450	.0431
MAFRO	...	300,000	Sector	.155	.155	.125	2.57	10,440	.0360
MAFTY	...	350,000	Sector	.155	.155	.135	2.70	11,740	.0308
MAFUS	...	400,000	Sector	.155	.155	.135	2.80	12,710	.0270
MAFYT	...	500,000	Sector	.155	.155	.140	3.00	14,900	.0216
MAGAP	...	600,000	Sector	.155	.155	.140	3.18	16,760	.0180

PAPER INSULATED—LEAD SHEATHED CABLE
Compound-Filled Type

FOUR CONDUCTOR—BELTED — 15,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
LYPON	6	26,250	Round	.155	.080	.100	1.56	3,470	.410
LYPUP	4	41,740	Round	.155	.080	.100	1.67	3,960	.259
LYPWY	2	66,370	Round	.155	.080	.110	1.83	4,880	.162
LYRAM	1	83,690	Round	.155	.080	.110	1.93	5,380	.129
LYREN	1/0	105,500	Round	.155	.080	.115	2.04	6,190	.102
LYRIP	2/0	133,100	Sector	.155	.080	.110	1.92	5,880	.0811
LYRMA	3/0	167,800	Sector	.155	.080	.115	2.04	6,880	.0642
LYRNE	4/0	211,600	Sector	.155	.080	.115	2.17	7,760	.0509
LYRUR	...	250,000	Sector	.155	.080	.115	2.28	8,520	.0431
LYRYZ	...	300,000	Sector	.155	.080	.125	2.42	9,810	.0360
LYSAN	...	350,000	Sector	.155	.080	.125	2.53	10,760	.0308
LYSEP	...	400,000	Sector	.155	.080	.125	2.63	11,700	.0270
LYSNA	...	500,000	Sector	.155	.080	.135	2.84	13,820	.0216
LYSOR	...	600,000	Sector	.155	.080	.140	3.03	15,990	.0180

FOUR CONDUCTOR—BELTED — 15,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Shape	Insulation Thickness, Inches Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diameter, Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
MAEPZ	6	26,250	Round	.155	.155	.110	1.73	4,140	.410
MAERC	4	41,740	Round	.155	.155	.110	1.84	4,660	.259
MAEVG	2	66,370	Round	.155	.155	.110	1.98	5,390	.162
MAEZK	1	83,690	Round	.155	.155	.115	2.09	6,160	.129
MAFAN	1/0	105,500	Round	.155	.155	.115	2.19	6,840	.102
MAFEP	2/0	133,100	Sector	.155	.155	.115	2.08	6,660	.0811
MAFNA	3/0	167,800	Sector	.155	.155	.115	2.20	7,430	.0642
MAFOR	4/0	211,600	Sector	.155	.155	.115	2.33	8,330	.0509
MAFPE	...	250,000	Sector	.155	.155	.125	2.45	9,450	.0431
MAFRO	...	300,000	Sector	.155	.155	.125	2.57	10,440	.0360
MAFTY	...	350,000	Sector	.155	.155	.135	2.70	11,740	.0308
MAFUS	...	400,000	Sector	.155	.155	.135	2.80	12,710	.0270
MAFYT	...	500,000	Sector	.155	.155	.140	3.00	14,900	.0216
MAGAP	...	600,000	Sector	.155	.155	.140	3.18	16,760	.0180

VARNISHED CAMBRIC INSULATED POWER CABLES

Canada Wire & Cable Co. manufactures a complete line of varnished cambric insulated wires and cables for building wiring, general power purposes, and for special applications where varnished cambric insulation is the most suitable type to employ.

The varnished cloth used for insulation consists of a specially processed cotton cloth, coated with individually baked films of insulating varnish. This type of insulation, applied helically around the conductor in tape form, has been in commercial use since 1902.

Varnished cambric insulation has moisture resistance to a degree which makes it suitable for station wiring without the additional protection of a lead sheath. It is not affected by ordinary oils and greases, it is highly resistant to corona discharges, and its ruggedness enables it to withstand any reasonable mechanical stress during installation. It has high dielectric strength and long life, and its high safe operating temperatures permit large current carrying capacities.

For underground installations or where exposed to moisture conditions beyond that usually encountered in indoor installations, it must be protected by a lead sheath.

The type of varnish used has undergone a series of continuous improvements, and as a result, Canada Wire & Cable Co. has standardized on two types of cloth for cable work, standard and heat resisting.

The lead sheathed wire or cable may be pulled through conduits, either underground or along building walls, etc., if protection against mechanical injury is necessary; or if this protection is not necessary it may be itself clipped to walls or ceilings.

As an alternative to the use of conduit for mechanical protection, a steel armouring is frequently applied over the lead sheath in the factory, permitting the wire or cable to be buried directly in the ground, or trained along walls with no further protection.

See pages 20 to 25 for armouring.

INSULATION THICKNESSES—V.C. INSULATED

SINGLE OR MULTI-CONDUCTOR CABLES—TYPE "H" (Shielded)

(Standard or Heat-Resisting V.C.)

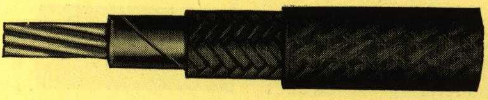
Rated Voltage Phase to Phase	Size of Conductor B. & S. or 1,000 Circular Mils	Insulation Thickness: Grounded Neutral Mils	Grounded Neutral Inches	Ungrounded Neutral Mils	Ungrounded Neutral Inches
600	10-8	45	3/64	45	3/64
	7-2	65	4/64	65	4/64
	1-4/0	80	5/64	80	5/64
	213-500	95	6/64	95	6/64
	501-1,000	110	7/64	110	7/64
	Over 1,000	125	8/64	125	8/64
1,000	10-2	65	4/64	65	4/64
	1-4/0	80	5/64	80	5/64
	213-500	95	6/64	95	6/64
	501-1,000	110	7/64	110	7/64
	Over 1,000	125	8/64	125	8/64
2,000	8-2	80	5/64	80	5/64
	1-4/0	95	6/64	95	6/64
	213-500	95	6/64	95	6/64
	501-1,000	110	7/64	110	7/64
	Over 1,000	125	8/64	125	8/64
3,000	8-2	95	6/64	95	6/64
	1-4/0	95	6/64	95	6/64
	213-500	110	7/64	110	7/64
	501-1,000	110	7/64	110	7/64
	Over 1,000	125	8/64	125	8/64
4,000	8-4/0	110	7/64	110	7/64
	213-1,000	125	8/64	125	8/64
	Over 1,000	140	9/64	140	9/64
5,000	8-4/0	125	8/64	140	9/64
	213-1,000	140	9/64	155	10/64
	Over 1,000	140	9/64	155	10/64
6,000	6-4/0	140	9/64	155	10/64
	213-1,000	140	9/64	170	11/64
	Over 1,000	140	9/64	170	11/64
7,000	6 and over	155	10/64	170	11/64
8,000	6 and over	170	11/64	190	12/64
9,000	4 and over	170	11/64	205	13/64
10,000	4 and over	190	12/64	235	15/64
11,000	2 and over	205	13/64	250	16/64
12,000	2 and over	220	14/64	250	16/64
13,000	2 and over	235	15/64	280	18/64
14,000	2 and over	235	15/64	295	19/64
15,000	1 and over	250	16/64	330	21/64
16,000	1 and over	265	17/64	...	.....
17,000	1 and over	280	18/64	...	.....
18,000	1 and over	295	19/64	...	.....
19,000	1 and over	315	20/64	...	.....
20,000	1 and over	330	21/64	...	.....
21,000	1 and over	345	22/64	...	.....
22,000	1 and over	360	23/64	...	.....
23,000	1/0 and over	375	24/64	...	.....
24,000	1/0 and over	390	25/64	...	.....
25,000	1/0 and over	405	26/64	...	.....

All cables have an operating tolerance of 5% above the rated voltage, except those rated at 15,000 volts and below, which have no operating tolerance.

INSULATION THICKNESSES—V.C. INSULATED
MULTI-CONDUCTOR CABLES—BELTED TYPE
(Standard or Heat-Resisting V.C.)

Rated Voltage Phase to Phase	Size of Conductor B. & S. or 1,000 C.M.	INSULATION THICKNESS — Conductor — Mils	Conductor — Inches	Belt — Grounded Neutral — Mils	Grounded Neutral — Inches	Belt — Ungrounded Neutral — Mils	Ungrounded Neutral — Inches
600	10–8	45	3/64	0	0	0	0
	7-2	65	4/64	0	0	0	0
	1-4/0	80	5/64	0	0	0	0
	213-500	95	6/64	0	0	0	0
	501-1,000	95	6/64	30	2/64	30	2/64
	Over 1,000	110	7/64	30	2/64	30	2/64
1,000	10–2	65	4/64	0	0	0	0
	1-4/0	80	5/64	0	0	0	0
	213-500	95	6/64	0	0	0	0
	501-1,000	95	6/64	30	2/64	30	2/64
	Over 1,000	110	7/64	30	2/64	30	2/64
2,000	8–2	80	5/64	0	0	0	0
	1-4/0	95	6/64	0	0	0	0
	213-500	95	6/64	0	0	0	0
	501-1,000	95	6/64	30	2/64	30	2/64
	Over 1,000	110	7/64	30	2/64	30	2/64
3,000	8–2	80	5/64	30	2/64	30	2/64
	1-4/0	95	6/64	30	2/64	30	2/64
	213-500	95	6/64	30	2/64	30	2/64
	501-1,000	95	6/64	45	3/64	45	3/64
	Over 1,000	110	7/64	45	3/64	45	3/64
4,000	8-4/0	95	6/64	45	3/64	45	3/64
	213-500	95	6/64	45	3/64	45	3/64
	501-1,000	95	6/64	65	4/64	65	4/64
	Over 1,000	110	7/64	65	4/64	65	4/64
5,000	8-4/0	95	6/64	65	4/64	65	4/64
	213-1,000	110	7/64	65	4/64	65	4/64
	Over 1,000	110	7/64	80	5/64	80	5/64
6,000	6-4/0	95	6/64	80	5/64	80	5/64
	213-1,000	110	7/64	80	5/64	80	5/64
	Over 1,000	110	7/64	80	5/64	80	5/64
7,000	6 and larger	110	7/64	80	5/64	95	6/64
8,000	6 and larger	110	7/64	95	6/64	110	7/64
9,000	4 and larger	125	8/64	95	6/64	125	8/64
10,000	4 and larger	140	9/64	95	6/64	140	9/64
11,000	2 and larger	155	10/64	95	6/64	155	10/64
12,000	2 and larger	155	10/64	110	7/64	155	10/64
13,000	2 and larger	170	11/64	110	7/64	170	11/64
14,000	2 and larger	190	12/64	110	7/64	190	12/64
15,000	1 and larger	205	13/64	110	7/64	205	13/64

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR—SOLID SINGLE BRAID TYPE "V" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JOPYK	14	4,107	.064	3/64	.188	.028	25	2.58
JORAG	12	6,530	.081	3/64	.205	.033	34	1.62
JORGA	10	10,380	.102	3/64	.232	.042	49	1.02
JORHE	8	16,510	.128	3/64	.294	.068	79	0.641

SINGLE CONDUCTOR—STRANDED, SINGLE BRAID TYPE "V" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JORIJ	14	4,107	7/.0242	.073	3/64	.197	.030	26	2.63
JORKO	12	6,530	7/.0305	.092	3/64	.216	.037	36	1.65
JORMY	10	10,380	7/.0385	.116	3/64	.246	.047	51	1.03
JOROK	8	16,510	7/.0486	.146	3/64	.312	.076	82	0.654

SINGLE CONDUCTOR—SOLID, DOUBLE BRAID TYPE "V" 600 VOLTS

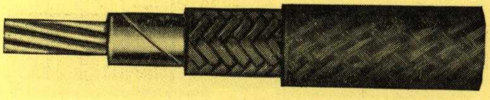
Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JORUL	14	4,107	.064	3/64	.218	.037	33	2.58
JOSAH	12	6,530	.081	3/64	.235	.043	44	1.62
JOSHA	10	10,380	.102	3/64	.268	.056	60	1.02
JOSIK	8	16,510	.128	3/64	.334	.088	100	0.641

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE

SINGLE CONDUCTOR—STRANDED, DOUBLE BRAID TYPE "V" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JOSJE	14	4,107	7/.0242	.073	3/64	.227	.040	34	2.63
JOSLO	12	6,530	7/.0305	.092	3/64	.246	.047	41	1.65
JOSNY	10	10,380	7/.0385	.116	3/64	.282	.062	59	1.03
JOSOL	8	16,510	7/.0486	.146	3/64	.320	.080	76	0.654
JOSUM	6	26,250	7/.0612	.184	4/64	.370	.107	125	.410
JOSYN	5	33,100	7/.0688	.206	4/64	.392	.120	150	.326
JOTAJ	4	41,740	7/.0772	.232	4/64	.418	.137	180	.259
JOTEK	3	52,640	7/.0867	.260	4/64	.456	.163	225	.205
JOTIL	2	66,370	7/.0974	.292	4/64	.488	.187	270	.162
JOTJA	1	83,690	19/.0664	.332	5/64	.558	.244	345	.129
JOTKE	1/0	105,500	19/.0745	.373	5/64	.599	.282	420	.102
JOTMO	2/0	133,100	19/.0837	.418	5/64	.654	.336	520	.0811
JOTPY	3/0	167,800	19/.0940	.470	5/64	.705	.390	635	.0642
JOTYP	4/0	211,600	19/.1055	.528	5/64	.764	.458	785	.0509
JOUBT	...	250,000	37/.0822	.575	6/64	.843	.558	935	.0431
JOUFY	...	300,000	37/.0900	.630	6/64	.898	.633	1,100	.0360
JOUGZ	...	350,000	37/.0973	.681	6/64	.949	.707	1,270	.0308
JOUHB	...	400,000	37/.1040	.728	6/64	.996	.779	1,440	.0270
JOUKD	...	500,000	37/.1162	.814	6/64	1.08	.916	1,760	.0216
JOUMG	...	600,000	61/.0992	.893	7/64	1.21	1.15	2,130	.0180
JOUSN	...	700,000	61/.1071	.964	7/64	1.28	1.29	2,460	.0154
JOVAK	...	750,000	61/.1109	.998	7/64	1.32	1.37	2,630	.0144
JOVEL	...	800,000	61/.1145	1.031	7/64	1.34	1.41	2,790	.0135
JOVKA	...	900,000	61/.1215	1.093	7/64	1.43	1.61	3,140	.0120
JOVLE	...	1,000,000	61/.1280	1.152	7/64	1.49	1.74	3,460	.0108
JOVNO	...	1,250,000	91/.1172	1.290	8/64	1.66	2.16	4,320	.00863
JOVON	...	1,500,000	91/.1284	1.412	8/64	1.78	2.49	5,130	.00719
JOVUP	...	1,750,000	127/.1174	1.526	8/64	1.90	2.83	5,930	.00617
JOWAL	...	2,000,000	127/.1255	1.631	8/64	2.00	3.14	6,750	.00539

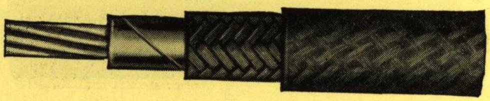
VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR TYPE "V-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JOWEM	10	10,380	7/.0385	.116	4/64	.302	.072	66	1.03
JOWLA	8	16,510	7/.0486	.146	4/64	.332	.087	89	0.654
JOWME	6	26,250	7/.0612	.184	4/64	.370	.107	125	.410
JOWOP	5	33,100	7/.0688	.206	4/64	.392	.120	150	.326
JOWPO	4	41,740	7/.0772	.232	4/64	.418	.137	180	.259
JOWRY	3	52,640	7/.0867	.260	4/64	.456	.163	225	.205
JOWYR	2	66,370	7/.0974	.292	4/64	.488	.187	270	.162
JOYAM	1	83,690	19/.0664	.332	5/64	.558	.244	345	.129
JOYEN	1/0	105,500	19/.0745	.373	5/64	.599	.282	420	.102
JOYIP	2/0	133,100	19/.0837	.418	5/64	.654	.336	520	.0811
JOYJD	3/0	167,800	19/.0940	.470	5/64	.705	.390	635	.0642
JOYLG	4/0	211,600	19/.1055	.528	5/64	.764	.458	785	.0509
JOYMA	...	250,000	37/.0822	.575	6/64	.843	.558	935	.0431
JOYNE	...	300,000	37/.0900	.630	6/64	.898	.633	1,100	.0360
JOYSY	...	350,000	37/.0973	.681	6/64	.949	.707	1,270	.0308
JOYUR	...	400,000	37/.1040	.728	6/64	.996	.779	1,440	.0270
JOYZT	...	500,000	37/.1162	.814	6/64	1.08	.916	1,760	.0216
JOZAM	...	600,000	61/.0992	.893	7/64	1.21	1.15	2,130	.0180
JOZEP	...	700,000	61/.1071	.964	7/64	1.28	1.29	2,460	.0154
JOZNA	...	750,000	61/.1109	.998	7/64	1.32	1.37	2,630	.0144
JOZOR	...	800,000	61/.1145	1.031	7/64	1.34	1.41	2,790	.0135
JOZPE	...	900,000	61/.1215	1.093	7/64	1.43	1.61	3,140	.0120
JOZRO	...	1,000,000	61/.1280	1.152	7/64	1.49	1.74	3,460	.0108
JOZTY	...	1,250,000	91/.1172	1.290	8/64	1.66	2.16	4,320	.00863
JOZUS	...	1,500,000	91/.1284	1.412	8/64	1.78	2.49	5,130	.00719
JOZYT	...	1,750,000	127/.1174	1.526	8/64	1.90	2.83	5,930	.00617
JUABT	...	2,000,000	127/.1255	1.631	8/64	2.00	3.14	6,750	.00539

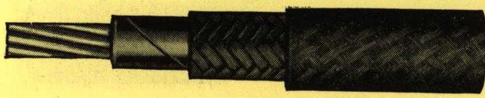
VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR TYPE "V-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JUAFY	8	16,510	7/.0486	.146	5/64	.362	.103	98	.654
JUAGZ	6	26,250	7/.0612	.184	5/64	.400	.126	135	.410
JUAHB	5	33,100	7/.0688	.206	5/64	.422	.140	160	.326
JUAKD	4	41,740	7/.0772	.232	5/64	.458	.165	195	.259
JUALF	3	52,640	7/.0867	.260	5/64	.486	.186	235	.205
JUAMG	2	66,370	7/.0974	.292	5/64	.518	.211	285	.162
JUARL	1	83,690	19/.0664	.332	6/64	.590	.273	360	.129
JUASM	1/0	105,500	19/.0745	.373	6/64	.641	.323	440	.102
JUBAT	2/0	133,100	19/.0837	.418	6/64	.686	.370	535	.0811
JUBEV	3/0	167,800	19/.0940	.470	6/64	.738	.428	655	.0642
JUBOY	4/0	211,600	19/.1055	.528	6/64	.796	.498	805	.0509
JUBTA	...	250,000	37/.0822	.575	6/64	.843	.558	935	.0431
JUBUZ	...	300,000	37/.0900	.630	6/64	.898	.633	1,100	.0360
JUBVE	...	350,000	37/.0973	.681	6/64	.949	.707	1,270	.0308
JUBYO	...	400,000	37/.1040	.728	6/64	.996	.779	1,440	.0270
JUCAV	...	500,000	37/.1162	.814	6/64	1.08	.916	1,760	.0216
JUCIX	...	600,000	61/.0992	.893	7/64	1.21	1.15	2,130	.0180
JUCOZ	...	700,000	61/.1071	.964	7/64	1.28	1.29	2,460	.0154
JUCUB	...	750,000	61/.1109	.998	7/64	1.32	1.37	2,630	.0144
JUCVA	...	800,000	61/.1145	1.031	7/64	1.34	1.41	2,790	.0135
JUCWE	...	900,000	61/.1215	1.093	7/64	1.43	1.61	3,140	.0120
JUCZO	...	1,000,000	61/.1280	1.152	7/64	1.49	1.74	3,460	.0108
JUDBO	...	1,250,000	91/.1172	1.290	8/64	1.66	2.16	4,320	.00863
JUDIZ	...	1,500,000	91/.1284	1.412	8/64	1.78	2.49	5,130	.00719
JUDOB	...	1,750,000	127/.1174	1.526	8/64	1.90	2.83	5,930	.00617
JUDUC	...	2,000,000	127/.1255	1.631	8/64	2.00	3.14	6,750	.00539

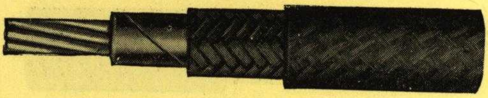
VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR TYPE "V-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JUDWA	8	16,510	7/.0486	.146	6/64	.374	.110	115	.654
JUDYE	6	26,250	7/.0612	.184	6/64	.432	.147	145	.410
JUEDY	5	33,100	7/.0688	.206	6/64	.464	.169	175	.326
JUEJD	4	41,740	7/.0772	.232	6/64	.490	.189	210	.259
JUELG	3	52,640	7/.0867	.260	6/64	.518	.211	250	.205
JUENJ	2	66,370	7/.0974	.292	6/64	.550	.238	300	.162
JUEPK	1	83,690	19/.0664	.332	6/64	.590	.273	360	.129
JUERM	1/0	105,500	19/.0745	.373	6/64	.641	.323	440	.102
JUEWR	2/0	133,100	19/.0837	.418	6/64	.686	.370	540	.0811
JUEZT	3/0	167,800	19/.0940	.470	6/64	.738	.428	655	.0642
JUFAY	4/0	211,600	19/.1055	.528	6/64	.796	.498	805	.0509
JUFCO	...	250,000	37/.0822	.575	7/64	.873	.599	955	.0431
JUFEZ	...	300,000	37/.0900	.630	7/64	.928	.676	1,120	.0360
JUFIB	...	350,000	37/.0973	.681	7/64	.979	.753	1,290	.0308
JUFOC	...	400,000	37/.1040	.728	7/64	1.026	.833	1,460	.0270
JUFUD	...	500,000	37/.1162	.814	7/64	1.112	.968	1,780	.0216
JUFYA	...	600,000	61/.0992	.893	7/64	1.21	1.15	2,130	.0180
JUFZE	...	700,000	61/.1071	.964	7/64	1.28	1.29	2,460	.0154
JUGAZ	...	750,000	61/.1109	.998	7/64	1.32	1.37	2,630	.0144
JUGBE	...	800,000	61/.1145	1.031	7/64	1.34	1.41	2,790	.0135
JUGDO	...	900,000	61/.1215	1.093	7/64	1.43	1.61	3,140	.0120
JUGEB	...	1,000,000	61/.1280	1.152	7/64	1.49	1.74	3,460	.0108
JUGGY	...	1,250,000	91/.1172	1.290	8/64	1.66	2.16	4,320	.00863
JUGIC	...	1,500,000	91/.1284	1.412	8/64	1.78	2.49	5,130	.00719
JUGOD	...	1,750,000	127/.1174	1.526	8/64	1.90	2.83	5,930	.00617
JUGUF	...	2,000,000	127/.1255	1.631	8/64	2.00	3.14	6,750	.00539

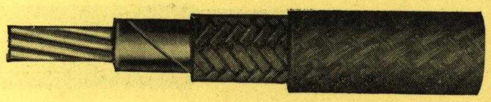
VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR TYPE "V-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JUGYG	8	16,510	7/.0486	.146	7/64	.434	.148	120	.654
JUGZA	6	26,250	7/.0612	.184	7/64	.472	.175	155	.410
JUHAB	5	33,100	7/.0688	.206	7/64	.494	.192	190	.326
JUHBA	4	41,740	7/.0772	.232	7/64	.520	.212	220	.259
JUHCE	3	52,640	7/.0867	.260	7/64	.548	.236	260	.205
JUHEC	2	66,370	7/.0974	.292	7/64	.580	.264	315	.162
JUHFO	1	83,690	19/.0664	.332	7/64	.630	.312	380	.129
JUHID	1/0	105,500	19/.0745	.373	7/64	.671	.354	460	.102
JUHOF	2/0	133,100	19/.0837	.418	7/64	.716	.403	555	.0811
JUHUG	3/0	167,800	19/.0940	.470	7/64	.768	.463	675	.0642
JUHYH	4/0	211,600	19/.1055	.528	7/64	.826	.536	825	.0509
JUIJF	...	250,000	37/.0822	.575	8/64	.905	.643	980	.0431
JUIRN	...	300,000	37/.0900	.630	8/64	.960	.724	1,150	.0360
JUIXT	...	350,000	37/.0973	.681	8/64	1.01	.801	1,320	.0308
JUJAC	...	400,000	37/.1040	.728	8/64	1.06	.882	1,490	.0270
JUJCA	...	500,000	37/.1162	.814	8/64	1.14	1.02	1,810	.0216
JUJDE	...	600,000	61/.0992	.893	8/64	1.24	1.21	2,170	.0180
JUJED	...	700,000	61/.1071	.964	8/64	1.31	1.35	2,500	.0154
JUJGO	...	750,000	61/.1109	.998	8/64	1.35	1.43	2,670	.0144
JUJIF	...	800,000	61/.1145	1.031	8/64	1.38	1.50	2,830	.0135
JUJOG	...	900,000	61/.1215	1.093	8/64	1.46	1.67	3,180	.0120
JUJUH	...	1,000,000	61/.1280	1.152	8/64	1.52	1.81	3,510	.0108
JUJYJ	...	1,250,000	91/.1172	1.290	9/64	1.70	2.24	4,370	.00863
JUKAD	...	1,500,000	91/.1284	1.412	9/64	1.81	2.57	5,180	.00719
JUKDA	...	1,750,000	127/.1174	1.526	9/64	1.93	2.93	5,980	.00617
JUKEF	...	2,000,000	127/.1255	1.631	9/64	2.03	3.24	6,800	.00539

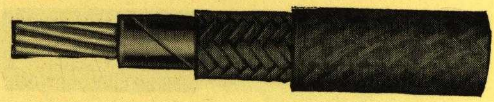
VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR TYPE "V-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Area Insulated Cond., Square Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JUKFE	8	16,510	7/.0486	.146	9/64	.498	.195	150	.654
JUKHO	6	26,250	7/.0612	.184	9/64	.536	.226	190	.410
JUKIG	5	33,100	7/.0688	.206	9/64	.558	.245	215	.326
JUKOH	4	41,740	7/.0772	.232	9/64	.584	.268	250	.259
JUKUJ	3	52,640	7/.0867	.260	9/64	.622	.304	300	.205
JUKYK	2	66,370	7/.0974	.292	9/64	.654	.336	350	.162
JULAF	1	83,690	19/.0664	.332	9/64	.694	.378	415	.129
JULEG	1/0	105,500	19/.0745	.373	9/64	.735	.424	495	.102
JULFA	2/0	133,100	19/.0837	.418	9/64	.780	.478	595	.0811
JULGE	3/0	167,800	19/.0940	.470	9/64	.832	.544	720	.0642
JULJO	4/0	211,600	19/.1055	.528	9/64	.890	.622	870	.0509
JULLY	...	250,000	37/.0822	.575	10/64	.967	.734	1,030	.0431
JULOJ	...	300,000	37/.0900	.630	10/64	1.02	.817	1,200	.0360
JULUK	...	350,000	37/.0973	.681	10/64	1.07	.899	1,370	.0308
JULYL	...	400,000	37/.1040	.728	10/64	1.12	.985	1,550	.0270
JUMAG	...	500,000	37/.1162	.814	10/64	1.23	1.17	1,900	.0216
JUMGA	...	600,000	61/.0992	.893	10/64	1.31	1.33	2,230	.0180
JUMHE	...	700,000	61/.1071	.964	10/64	1.38	1.48	2,570	.0154
JUMIJ	...	750,000	61/.1109	.998	10/64	1.43	1.61	2,760	.0144
JUMKO	...	800,000	61/.1145	1.031	10/64	1.46	1.68	2,920	.0135
JUMMY	...	900,000	61/.1215	1.093	10/64	1.53	1.82	3,260	.0120
JUMOK	...	1,000,000	61/.1280	1.152	10/64	1.58	1.97	3,590	.0108
JUMUL	...	1,250,000	91/.1172	1.290	10/64	1.72	2.32	4,410	.00863
JUNAH	...	1,500,000	91/.1284	1.412	10/64	1.84	2.66	5,220	.00719
JUNHA	...	1,750,000	127/.1174	1.526	10/64	1.96	3.01	6,030	.00617
JUNIK	...	2,000,000	127/.1255	1.631	10/64	2.06	3.33	6,850	.00539

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR — 7,000 VOLTS

(Grounded Neutral)

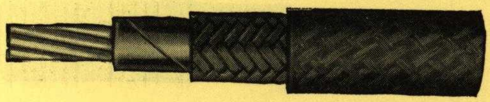
Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Ins.	Insula-tion Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance Ohms/ 1,000′ @ 25°C.
OGABY	6	26,250	7/.0612	.184	.155	.55	195	.410
OGAGD	4	41,740	7/.0772	.232	.155	.60	260	.259
OGALJ	2	66,370	7/.0974	.292	.155	.67	360	.162
OGAMK	1	83,690	19/.0664	.332	.155	.71	430	.129
OGARP	1/0	105,500	19/.0745	.373	.155	.75	515	.102
OGAVS	2/0	133,100	19/.0837	.418	.155	.79	615	.0811
OGAWT	3/0	167,800	19/.0940	.470	.155	.84	740	.0642
OGBAY	4/0	211,600	19/.1055	.528	.155	.90	895	.0509
OGBEZ	...	250,000	37/.0822	.575	.155	.95	1,040	.0431
OGBIB	...	300,000	37/.0900	.630	.155	1.00	1,210	.0360
OGBOC	...	350,000	37/.0973	.681	.155	1.08	1,410	.0308
OGBUD	...	400,000	37/.1040	.728	.155	1.12	1,600	.0270
OGCAZ	...	500,000	37/.1162	.814	.155	1.23	1,950	.0216
OGCEB	...	600,000	61/.0992	.893	.155	1.31	2,300	.0180
OGCIC	...	750,000	61/.1109	.998	.155	1.43	2,840	.0144
OGCOD	...	1,000,000	61/.1280	1.152	.155	1.59	3,690	.0108
OGCUF	...	1,250,000	91/.1172	1.290	.155	1.72	4,540	.00863
OGCYG	...	1,500,000	91/.1284	1.412	.155	1.85	5,370	.00719
OGDAB	...	1,750,000	127/.1174	1.526	.155	1.96	6,230	.00617
OGDDO	...	2,000,000	127/.1255	1.631	.155	2.07	7,060	.00539

SINGLE CONDUCTOR — 7,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Ins.	Insula-tion Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance Ohms/ 1,000′ @ 25°C.
OGDEC	6	26,250	7/.0612	.184	.170	.58	210	.410
OGDFE	4	41,740	7/.0772	.232	.170	.64	270	.259
OGDID	2	66,370	7/.0974	.292	.170	.70	380	.162
OGDOF	1	83,690	19/.0664	.332	.170	.74	445	.129
OGDUG	1/0	105,500	19/.0745	.373	.170	.78	530	.102
OGDYH	2/0	133,100	19/.0837	.418	.170	.82	635	.0811
OGEBZ	3/0	167,800	19/.0940	.470	.170	.87	760	.0642
OGEFD	4/0	211,600	19/.1055	.528	.170	.93	920	.0509
OGELK	...	250,000	37/.0822	.575	.170	.98	1,060	.0431
OGETS	...	300,000	37/.0900	.630	.170	1.03	1,240	.0360
OGEVT	...	350,000	37/.0973	.681	.170	1.11	1,440	.0308
OGEZY	...	400,000	37/.1040	.728	.170	1.15	1,630	.0270
OGFAC	...	500,000	37/.1162	.814	.170	1.26	1,990	.0216
OGFED	...	600,000	61/.0992	.893	.170	1.34	2,330	.0180
OGFIF	...	750,000	61/.1109	.998	.170	1.46	2,880	.0144
OGFOG	...	1,000,000	61/.1280	1.152	.170	1.62	3,740	.0108
OGFUH	...	1,250,000	91/.1172	1.290	.170	1.75	4,590	.00863
OGFYJ	...	1,500,000	91/.1284	1.412	.170	1.88	5,430	.00719
OGGAD	...	1,750,000	127/.1174	1.526	.170	1.99	6,280	.00617
OGGEF	...	2,000,000	127/.1255	1.631	.170	2.10	7,110	.00539

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR — 8,000 VOLTS

(Grounded Neutral)

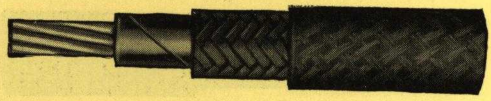
Code	Conductor Size		Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
	B. & S.	C.M.						
OBABS	6	26,250	7/.0612	.184	.170	.58	210	.410
OBACT	4	41,740	7/.0772	.232	.170	.64	270	.259
OBAGY	2	66,370	7/.0974	.292	.170	.70	380	.162
OBAHZ	1	83,690	19/.0664	.332	.170	.74	445	.129
OBALD	1/0	105,500	19/.0745	.373	.170	.78	530	.102
OBAMF	2/0	133,100	19/.0837	.418	.170	.82	635	.0811
OBANG	3/0	167,800	19/.0940	.470	.170	.87	760	.0642
OBAPH	4/0	211,600	19/.1055	.528	.170	.93	920	.0509
OBARK	...	250,000	37/.0822	.575	.170	.98	1,060	.0431
OBAWP	...	300,000	37/.0900	.630	.170	1.03	1,240	.0360
OBBAS	...	350,000	37/.0973	.681	.170	1.11	1,440	.0308
OBBGO	...	400,000	37/.1040	.728	.170	1.15	1,630	.0270
OBBHE	...	500,000	37/.1162	.814	.170	1.26	1,990	.0216
OBBJA	...	600,000	61/.0992	.893	.170	1.34	2,330	.0180
OBCHO	...	750,000	61/.1109	.998	.170	1.46	2,880	.0144
OBCOY	...	1,000,000	61/.1280	1.152	.170	1.62	3,740	.0108
OBCUZ	...	1,250,000	91/.1172	1.290	.170	1.75	4,590	.00863
OBDKE	...	1,500,000	91/.1284	1.412	.170	1.88	5,430	.00719
OBDLA	...	1,750,000	127/.1174	1.526	.170	1.99	6,280	.00617
OBDOZ	...	2,000,000	127/.1255	1.631	.170	2.10	7,110	.00539

SINGLE CONDUCTOR — 8,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size		Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
	B. & S.	C.M.						
OBDUB	6	26,250	7/.0612	.184	.190	.63	235	.410
OBEBT	4	41,740	7/.0772	.232	.190	.68	305	.259
OBEFY	2	66,370	7/.0974	.292	.190	.74	405	.162
OBEGZ	1	83,690	19/.0664	.332	.190	.78	475	.129
OBEKD	1/0	105,500	19/.0745	.373	.190	.82	560	.102
OBELF	2/0	133,100	19/.0837	.418	.190	.86	665	.0811
OBEMG	3/0	167,800	19/.0940	.470	.190	.91	790	.0642
OBERL	4/0	211,600	19/.1055	.528	.190	.97	955	.0509
OBFIZ	...	250,000	37/.0822	.575	.190	1.02	1,100	.0431
OBFLE	...	300,000	37/.0900	.630	.190	1.09	1,300	.0360
OBFMA	...	350,000	37/.0973	.681	.190	1.15	1,480	.0308
OBFOB	...	400,000	37/.1040	.728	.190	1.21	1,680	.0270
OBFUC	...	500,000	37/.1162	.814	.190	1.30	2,030	.0216
OBGAY	...	600,000	61/.0992	.893	.190	1.38	2,380	.0180
OBGEZ	...	750,000	61/.1109	.998	.190	1.50	2,930	.0144
OBGIB	...	1,000,000	61/.1280	1.152	.190	1.66	3,790	.0108
OBGLO	...	1,250,000	91/.1172	1.290	.190	1.79	4,640	.00863
OBGNA	...	1,500,000	91/.1284	1.412	.190	1.92	5,490	.00719
OBGOC	...	1,750,000	127/.1174	1.526	.190	2.03	6,370	.00617
OBGUD	...	2,000,000	127/.1255	1.631	.190	2.14	7,190	.00539

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR — 10,000 VOLTS

(Grounded Neutral)

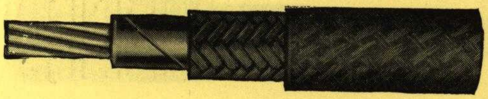
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OBHAZ	4	41,740	7/.0772	.232	.190	.68	305	.259
OBHEB	2	66,370	7/.0974	.292	.190	.74	405	.162
OBHIC	1	83,690	19/.0664	.332	.190	.78	475	.129
OBHOD	1/0	105,500	19/.0745	.373	.190	.82	560	.102
OBHUF	2/0	133,100	19/.0837	.418	.190	.86	665	.0811
OBHYG	3/0	167,800	19/.0940	.470	.190	.91	790	.0642
OBIJD	4/0	211,600	19/.1055	.528	.190	.97	955	.0509
OBILG	...	250,000	37/.0822	.575	.190	1.02	1,100	.0431
OBIPK	...	300,000	37/.0900	.630	.190	1.09	1,300	.0360
OBIRM	...	350,000	37/.0973	.681	.190	1.15	1,480	.0308
OBIZT	...	400,000	37/.1040	.728	.190	1.21	1,680	.0270
OBJAB	...	500,000	37/.1162	.814	.190	1.30	2,030	.0216
OBJEC	...	600,000	61/.0992	.893	.190	1.38	2,380	.0180
OBJID	...	750,000	61/.1109	.998	.190	1.50	2,930	.0144
OBJOF	...	1,000,000	61/.1280	1.152	.190	1.66	3,790	.0108
OBJUG	...	1,250,000	91/.1172	1.290	.190	1.79	4,640	.00863
OBJYH	...	1,500,000	91/.1284	1.412	.190	1.92	5,490	.00719
OBKAC	...	1,750,000	127/.1174	1.526	.190	2.03	6,370	.00617
OBKED	...	2,000,000	127/.1255	1.631	.190	2.14	7,190	.00539

SINGLE CONDUCTOR — 10,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OBKIF	4	41,740	7/.0772	.232	.235	.77	355	.259
OBKOG	2	66,370	7/.0974	.292	.235	.83	460	.162
OBKRA	1	83,690	19/.0664	.332	.235	.87	535	.129
OBKUH	1/0	105,500	19/.0745	.373	.235	.91	625	.102
OBKYJ	2/0	133,100	19/.0837	.418	.235	.95	730	.0811
OBLAD	3/0	167,800	19/.0940	.470	.235	1.00	865	.0642
OBLEF	4/0	211,600	19/.1055	.528	.235	1.06	1,030	.0509
OBLIG	...	250,000	37/.0822	.575	.235	1.13	1,210	.0431
OBLOH	...	300,000	37/.0900	.630	.235	1.20	1,410	.0360
OBLUJ	...	350,000	37/.0973	.681	.235	1.26	1,590	.0308
OBLYK	...	400,000	37/.1040	.728	.235	1.30	1,780	.0270
OBNAG	...	500,000	37/.1162	.814	.235	1.41	2,150	.0216
OBNEH	...	600,000	61/.0992	.893	.235	1.49	2,520	.0180
OBNIJ	...	750,000	61/.1109	.998	.235	1.59	3,050	.0144
OBNOK	...	1,000,000	61/.1280	1.152	.235	1.75	3,920	.0108
OBNUL	...	1,250,000	91/.1172	1.290	.235	1.88	4,780	.00863
OBNYM	...	1,500,000	91/.1284	1.412	.235	2.01	5,640	.00719
OBOCY	...	1,750,000	127/.1174	1.526	.235	2.12	6,510	.00617
OBODZ	...	2,000,000	127/.1255	1.631	.235	2.23	7,350	.00539

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE



SINGLE CONDUCTOR — 12,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OBOHD	2	66,370	7/.0974	.292	.220	.80	440	.162
OBOJF	1	83,690	19/.0664	.332	.220	.84	515	.129
OBONK	1/0	105,500	19/.0745	.373	.220	.88	600	.102
OBORN	2/0	133,100	19/.0837	.418	.220	.92	705	.0811
OBOSP	3/0	167,800	19/.0940	.470	.220	.97	840	.0642
OBOWS	4/0	211,600	19/.1055	.528	.220	1.03	1,010	.0509
OBOXT	...	250,000	37/.0822	.575	.220	1.10	1,180	.0431
OBPAH	...	300,000	37/.0900	.630	.220	1.15	1,360	.0360
OBPIK	...	350,000	37/.0973	.681	.220	1.23	1,560	.0308
OBPOL	...	400,000	37/.1040	.728	.220	1.27	1,750	.0270
OBPUM	...	500,000	37/.1162	.814	.220	1.36	2,100	.0216
OBPWA	...	600,000	61/.0992	.893	.220	1.46	2,470	.0180
OBPYN	...	750,000	61/.1109	.998	.220	1.56	3,010	.0144
OBRAK	...	1,000,000	61/.1280	1.152	.220	1.72	3,880	.0108
OBREL	...	1,250,000	91/.1172	1.290	.220	1.85	4,740	.00863
OBRIM	...	1,500,000	91/.1284	1.412	.220	1.98	5,590	.00719
OBRON	...	1,750,000	127/.1174	1.526	.220	2.09	6,460	.00617
OBRUP	...	2,000,000	127/.1255	1.631	.220	2.20	7,290	.00539

SINGLE CONDUCTOR — 12,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OBSAL	2	66,370	7/.0974	.292	.250	.86	485	.162
OBSBA	1	83,690	19/.0664	.332	.250	.90	555	.129
OBSEM	1/0	105,500	19/.0745	.373	.250	.94	645	.102
OBSIN	2/0	133,100	19/.0837	.418	.250	.98	755	.0811
OBSOP	3/0	167,800	19/.0940	.470	.250	1.03	890	.0642
OBSYR	4/0	211,600	19/.1055	.528	.250	1.11	1,090	.0509
OBTAM	...	250,000	37/.0822	.575	.250	1.16	1,230	.0431
OBTEN	...	300,000	37/.0900	.630	.250	1.23	1,440	.0360
OBTIP	...	350,000	37/.0973	.681	.250	1.29	1,620	.0308
OBTUR	...	400,000	37/.1040	.728	.250	1.33	1,810	.0270
OBTYS	...	500,000	37/.1162	.814	.250	1.44	2,190	.0216
OBUBY	...	600,000	61/.0992	.893	.250	1.52	2,550	.0180
OBUGD	...	750,000	61/.1109	.998	.250	1.62	3,090	.0144
OBULJ	...	1,000,000	61/.1280	1.152	.250	1.78	3,970	.0108
OBUMK	...	1,250,000	91/.1172	1.290	.250	1.91	4,830	.00863
OBURP	...	1,500,000	91/.1284	1.412	.250	2.04	5,690	.00719
OBVAN	...	1,750,000	127/.1174	1.526	.250	2.15	6,560	.00617
OBVEP	...	2,000,000	127/.1255	1.631	.250	2.26	7,410	.00539

VARNISHED CAMBRIC INSULATED BRAID COVERED CABLE

SINGLE CONDUCTOR — 15,000 VOLTS

(Grounded Neutral)

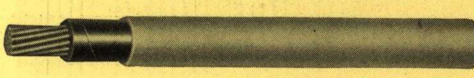
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
OBVOR	1	83,690	19/.0664	.332	.250	.90	555	.129
OBVUS	1/0	105,500	19/.0745	.373	.250	.94	645	.102
OBVYT	2/0	133,100	19/.0837	.418	.250	.98	755	.0811
OBWAP	3/0	167,800	19/.0940	.470	.250	1.03	890	.0642
OBWIR	4/0	211,600	19/.1055	.528	.250	1.11	1,090	.0509
OBWOS	...	250,000	37/.0822	.575	.250	1.16	1,230	.0431
OBWUT	...	300,000	37/.0900	.630	.250	1.23	1,440	.0360
OBWYV	...	350,000	37/.0973	.681	.250	1.29	1,620	.0308
OBYDO	...	400,000	37/.1040	.728	.250	1.33	1,810	.0270
OBYFE	...	500,000	37/.1162	.814	.250	1.44	2,190	.0216
OBYGA	...	600,000	61/.0992	.893	.250	1.52	2,550	.0180
OBZFO	...	750,000	61/.1109	.998	.250	1.62	3,090	.0144
OBZHA	...	1,000,000	61/.1280	1.152	.250	1.78	3,970	.0108
OBZYX	...	1,250,000	91/.1172	1.290	.250	1.91	4,830	.00863
OCAGS	...	1,500,000	91/.1284	1.412	.250	2.04	5,690	.00719
OCAHT	...	1,750,000	127/.1174	1.526	.250	2.15	6,560	.00617
OCALY	...	2,000,000	127/.1255	1.631	.250	2.26	7,410	.00539

SINGLE CONDUCTOR — 15,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/1,000′	Average Resistance Ohms/1,000′ @ 25°C.
OCAMZ	1	83,690	19/.0664	.332	.330	1.06	690	.129
OCANB	1/0	105,500	19/.0745	.373	.330	1.12	810	.102
OCARF	2/0	133,100	19/.0837	.418	.330	1.16	930	.0811
OCATH	3/0	167,800	19/.0940	.470	.330	1.23	1,090	.0642
OCAWK	4/0	211,600	19/.1055	.528	.330	1.29	1,270	.0509
OCAZM	...	250,000	37/.0822	.575	.330	1.34	1,420	.0431
OCBAN	...	300,000	37/.0900	.630	.330	1.41	1,640	.0360
OCBED	...	350,000	37/.0973	.681	.330	1.47	1,830	.0308
OCBHA	...	400,000	37/.1040	.728	.330	1.51	2,030	.0270
OCBOR	...	500,000	37/.1162	.814	.330	1.60	2,390	.0216
OCBUS	...	600,000	61/.0992	.893	.330	1.68	2,770	.0180
OCBYT	...	750,000	61/.1109	.998	.330	1.78	3,320	.0144
OCCAP	...	1,000,000	61/.1280	1.152	.330	1.94	4,220	.0108
OCCGO	...	1,250,000	91/.1172	1.290	.330	2.07	5,110	.00863
OCCIR	...	1,500,000	91/.1284	1.412	.330	2.20	5,980	.00719
OCCJA	...	1,750,000	127/.1174	1.526	.330	2.31	6,870	.00617
OCCOS	...	2,000,000	127/.1255	1.631	.330	2.42	7,730	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR—SOLID TYPE "VL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000'	Average Resistance/ 1,000' @ 25°C.
JUNJE	14	4,107	.064	3/64	2/64	.25	130	2.58
JUNLO	12	6,530	.081	3/64	2/64	.27	150	1.62
JUNNY	10	10,380	.102	3/64	3/64	.33	255	1.02
JUNOL	8	16,510	.128	3/64	3/64	.37	320	0.641

SINGLE CONDUCTOR—STRANDED TYPE "VL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/ 1,000'	Average Resistance/ 1,000' @ 25°C.
JUNUM	14	4,107	7/.0242	.073	3/64	2/64	.26	135	2.63
JUNYN	12	6,530	7/.0305	.092	3/64	2/64	.28	155	1.65
JUOBY	10	10,380	7/.0385	.116	3/64	3/64	.34	265	1.03
JUOGD	8	16,510	7/.0486	.146	3/64	3/64	.37	345	0.654
JUOLJ	6	26,250	7/.0612	.184	4/64	4/64	.46	500	.410
JUORP	5	33,100	7/.0688	.206	4/64	4/64	.48	545	.326
JUOVS	4	41,740	7/.0772	.232	4/64	4/64	.50	600	.259
JUOWT	3	52,640	7/.0867	.260	4/64	4/64	.53	665	.205
JUPAJ	2	66,370	7/.0974	.292	4/64	4/64	.56	745	.162
JUPEK	1	83,690	19/.0664	.332	5/64	4/64	.63	885	.129
JUPIL	1/0	105,500	19/.0745	.373	5/64	4/64	.68	1,000	.102
JUPJA	2/0	133,100	19/.0837	.418	5/64	4/64	.72	1,130	.0811
JUPKE	3/0	167,800	19/.0940	.470	5/64	4/64	.77	1,300	.0642
JUPMO	4/0	211,600	19/.1055	.528	5/64	4/64	.83	1,500	.0509
JUPPY	...	250,000	37/.0822	.575	6/64	5/64	.94	1,940	.0431
JUPYP	...	300,000	37/.0900	.630	6/64	5/64	.99	2,170	.0360
JUREM	...	350,000	37/.0973	.681	6/64	5/64	1.05	2,400	.0308
JURLA	...	400,000	37/.1040	.728	6/64	5/64	1.09	2,620	.0270
JUROP	...	500,000	37/.1162	.814	6/64	5/64	1.18	3,040	.0216
JURYR	...	600,000	61/.0992	.893	7/64	6/64	1.32	3,850	.0180
JUSAM	...	700,000	61/.1071	.964	7/64	6/64	1.39	4,280	.0154
JUSEN	...	750,000	61/.1109	.998	7/64	6/64	1.42	4,500	.0144
JUSIP	...	800,000	61/.1145	1.031	7/64	6/64	1.46	4,700	.0135
JUSMA	...	900,000	61/.1215	1.093	7/64	6/64	1.52	5,110	.0120
JUSNE	...	1,000,000	61/.1280	1.152	7/64	6/64	1.58	5,520	.0108
JUSSY	...	1,250,000	91/.1172	1.290	8/64	7/64	1.78	7,020	.00863
JUSUR	...	1,500,000	91/.1284	1.412	8/64	7/64	1.90	8,020	.00719
JUSYS	...	1,750,000	127/.1174	1.526	8/64	7/64	2.01	9,010	.00617
JUTAN	...	2,000,000	127/.1255	1.631	8/64	7/64	2.12	10,000	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR　　TYPE "VL-10"　　1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Inches	Insula-tion Thick-ness, Ins.	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JUTEP	10	10,380	7/.0385	.116	4/64	3/64	.36	280	1.03
JUTNA	8	16,510	7/.0486	.146	4/64	3/64	.39	325	0.654
JUTOR	6	26,250	7/.0612	.184	4/64	4/64	.46	500	.410
JUTPE	5	33,100	7/.0688	.206	4/64	4/64	.48	545	.326
JUTRO	4	41,740	7/.0772	.232	4/64	4/64	.50	600	.259
JUTUS	3	52,640	7/.0867	.260	4/64	4/64	.53	665	.205
JUTYT	2	66,370	7/.0974	.292	4/64	4/64	.56	745	.162
JUVAP	1	83,690	19/.0664	.332	5/64	4/64	.63	880	.129
JUVIR	1/0	105,500	19/.0745	.373	5/64	4/64	.68	1,000	.102
JUVOS	2/0	133,100	19/.0837	.418	5/64	4/64	.72	1,135	.0811
JUVPA	3/0	167,800	19/.0940	.470	5/64	4/64	.77	1,300	.0642
JUVSO	4/0	211,600	19/.1055	.528	5/64	4/64	.83	1,500	.0509
JUVUT	...	250,000	37/.0822	.575	6/64	5/64	.94	1,940	.0431
JUVYV	...	300,000	37/.0900	.630	6/64	5/64	.99	2,170	.0360
JUWER	...	350,000	37/.0973	.681	6/64	5/64	1.05	2,400	.0308
JUWRE	...	400,000	37/.1040	.728	6/64	5/64	1.09	2,620	.0270
JUWUV	...	500,000	37/.1162	.814	6/64	5/64	1.18	3,040	.0216
JUYAR	...	600,000	61/.0992	.893	7/64	6/64	1.32	3,850	.0180
JUYIT	...	700,000	61/.1071	.964	7/64	6/64	1.39	4,280	.0154
JUYOV	...	750,000	61/.1109	.998	7/64	6/64	1.42	4,500	.0144
JUYRA	...	800,000	61/.1145	1.031	7/64	6/64	1.46	4,700	.0135
JUYSE	...	900,000	61/.1215	1.093	7/64	6/64	1.52	5,110	.0120
JUYVO	...	1,000,000	61/.1280	1.152	7/64	6/64	1.58	5,520	.0108
JUZAS	...	1,250,000	91/.1172	1.290	8/64	7/64	1.78	7,020	.00863
JUZET	...	1,500,000	91/.1284	1.412	8/64	7/64	1.90	8,020	.00719
JUZIV	...	1,750,000	127/.1174	1.526	8/64	7/64	2.01	9,010	.00617
JUZSA	...	2,000,000	127/.1255	1.631	8/64	7/64	2.12	10,000	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR TYPE "VL-20" 2,000 VOLTS

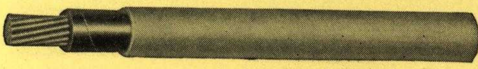
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance/1,000′ @ 25°C.
JUZTE	8	16,510	7/.0486	.146	5/64	3/64	.42	355	.654
JUZUX	6	26,250	7/.0612	.184	5/64	3/64	.45	420	.410
JUZWO	5	33,100	7/.0688	.206	5/64	3/64	.48	460	.326
JYABS	4	41,740	7/.0772	.232	5/64	3/64	.50	510	.259
JYACT	3	52,640	7/.0867	.260	5/64	4/64	.56	705	.205
JYAGY	2	66,370	7/.0974	.292	5/64	4/64	.59	785	.162
JYAHZ	1	83,690	19/.0664	.332	6/64	4/64	.67	930	.129
JYALD	1/0	105,500	19/.0745	.373	6/64	4/64	.71	1,040	.102
JYAMF	2/0	133,100	19/.0837	.418	6/64	4/64	.75	1,180	.0811
JYANG	3/0	167,800	19/.0940	.470	6/64	4/64	.80	1,350	.0642
JYAPH	4/0	211,600	19/.1055	.528	6/64	5/64	.89	1,760	.0509
JYARK	...	250,000	37/.0822	.575	6/64	5/64	.94	1,940	.0431
JYAWP	...	300,000	37/.0900	.630	6/64	5/64	.99	2,170	.0360
JYBAS	...	350,000	37/.0973	.681	6/64	5/64	1.05	2,400	.0308
JYBET	...	400,000	37/.1040	.728	6/64	5/64	1.09	2,620	.0270
JYBIV	...	500,000	37/.1162	.814	6/64	5/64	1.18	3,040	.0216
JYBSA	...	600,000	61/.0992	.893	7/64	6/64	1.32	3,850	.0180
JYBTE	...	700,000	61/.1071	.964	7/64	6/64	1.39	4,280	.0154
JYBUX	...	750,000	61/.1109	.998	7/64	6/64	1.42	4,500	.0144
JYBWO	...	800,000	61/.1145	1.031	7/64	6/64	1.46	4,700	.0135
JYCAT	...	900,000	61/.1215	1.093	7/64	6/64	1.52	5,110	.0120
JYCEV	...	1,000,000	61/.1280	1.152	7/64	6/64	1.58	5,520	.0108
JYCOY	...	1,250,000	91/.1172	1.290	8/64	7/64	1.78	7,020	.00863
JYCTA	...	1,500,000	91/.1284	1.412	8/64	7/64	1.90	8,020	.00719
JYCUZ	...	1,750,000	127/.1174	1.526	8/64	7/64	2.01	9,010	.00617
JYCVE	...	2,000,000	127/.1255	1.631	8/64	7/64	2.12	10,000	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR TYPE "VL-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JYCYO	8	16,510	7/.0486	.146	6/64	3/64	.41	365	.654
JYDAV	6	26,250	7/.0612	.184	6/64	3/64	.49	455	.410
JYDIX	5	33,100	7/.0688	.206	6/64	3/64	.51	495	.326
JYDOZ	4	41,740	7/.0772	.232	6/64	4/64	.57	685	.259
JYDUB	3	52,640	7/.0867	.260	6/64	4/64	.59	750	.205
JYDVA	2	66,370	7/.0974	.292	6/64	4/64	.63	830	.162
JYDWE	1	83,690	19/.0664	.332	6/64	4/64	.67	930	.129
JYDZO	1/0	105,500	19/.0745	.373	6/64	4/64	.71	1,040	.102
JYEBT	2/0	133,100	19/.0837	.418	6/64	4/64	.75	1,180	.0811
JYEFY	3/0	167,800	19/.0940	.470	6/64	4/64	.80	1,350	.0642
JYEGZ	4/0	211,600	19/.1055	.528	6/64	5/64	.89	1,760	.0509
JYEKD	...	250,000	37/.0822	.575	7/64	5/64	.97	2,000	.0431
JYELF	...	300,000	37/.0900	.630	7/64	5/64	1.02	2,230	.0360
JYEMG	...	350,000	37/.0973	.681	7/64	5/64	1.08	2,460	.0308
JYERL	...	400,000	37/.1040	.728	7/64	5/64	1.12	2,690	.0270
JYFBO	...	500,000	37/.1162	.814	7/64	6/64	1.24	3,410	.0216
JYFIZ	...	600,000	61/.0992	.893	7/64	6/64	1.32	3,850	.0180
JYFOB	...	700,000	61/.1071	.964	7/64	6/64	1.39	4,280	.0154
JYFUC	...	750,000	61/.1109	.998	7/64	6/64	1.42	4,500	.0144
JYFWA	...	800,000	61/.1145	1.031	7/64	6/64	1.46	4,700	.0135
JYFYE	...	900,000	61/.1215	1.093	7/64	6/64	1.52	5,110	.0120
JYGAY	...	1,000,000	61/.1280	1.152	7/64	6/64	1.58	5,520	.0108
JYGCO	...	1,250,000	91/.1172	1.290	8/64	7/64	1.78	7,020	.00863
JYGEZ	...	1,500,000	91/.1284	1.412	8/64	7/64	1.90	8,020	.00719
JYGIB	...	1,750,000	127/.1174	1.526	8/64	7/64	2.01	9,010	.00617
JYGOC	...	2,000,000	127/.1255	1.631	8/64	7/64	2.12	10,000	.00539

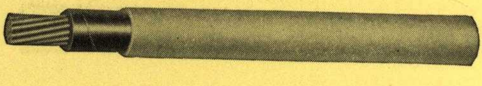
VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR **TYPE "VL-40"** **4,000 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Inches	Insula-tion Thick-ness, Ins.	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JYGUD	8	16,510	7/.0486	.146	7/64	3/64	.48	420	.654
JYGYA	6	26,250	7/.0612	.184	7/64	3/64	.52	475	.410
JYGZE	5	33,100	7/.0688	.206	7/64	4/64	.57	635	.326
JYHAZ	4	41,740	7/.0772	.232	7/64	4/64	.60	690	.259
JYHBE	3	52,640	7/.0867	.260	7/64	4,64	.62	760	.205
JYHDO	2	66,370	7/.0974	.292	7/64	4/64	.65	835	.162
JYHEB	1	83,690	19/.0664	.332	7/64	4/64	.70	970	.129
JYHIC	1/0	105,500	19/.0745	.373	7/64	4/64	.74	1,090	.102
JYHJY	2/0	133,100	19/.0837	.418	7/64	4/64	.78	1,230	.0811
JYHOD	3/0	167,800	19/.0940	.470	7/64	5/64	.86	1,600	.0642
JYHUF	4/0	211,600	19/.1055	.528	7/64	5/64	.92	1,810	.0509
JYHYJ	...	250,000	37/.0822	.575	8/64	5/64	1.00	2,060	.0431
JYHZA	...	300,000	37/.0900	.630	8/64	5/64	1.06	2,300	.0360
JYIJD	...	350,000	37/.0973	.681	8/64	5/64	1.11	2,520	.0308
JYILG	...	400,000	37/.1040	.728	8/64	5/64	1.15	2,750	.0270
JYIPK	...	500,000	37/.1162	.814	8/64	6/64	1.27	3,480	.0216
JYIRM	...	600,000	61/.0992	.893	8/64	6/64	1.35	3,930	.0180
JYIZT	...	700,000	61/.1071	.964	8/64	6/64	1.42	4,360	.0154
JYJAB	...	750,000	61/.1109	.998	8/64	6/64	1.46	4,570	.0144
JYJBA	...	800,000	61/.1145	1.031	8/64	6/64	1.49	4,780	.0135
JYJCE	...	900,000	61/.1215	1.093	8/64	6/64	1.55	5,190	.0120
JYJEC	...	1,000,000	61/.1280	1.152	8/64	6/64	1.61	5,600	.0108
JYJFO	...	1,250,000	91/.1172	1.290	9/64	7/64	1.81	7,140	.00863
JYJID	...	1,500,000	91/.1284	1.412	9/64	7/64	1.93	8,150	.00719
JYJKY	...	1,750,000	127/.1174	1.526	9/64	7/64	2.05	9,130	.00617
JYJOF	...	2,000,000	127/.1255	1.631	9/64	7/64	2.16	10,100	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR **TYPE "VL-50"** **5,000 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance/1,000′ @ 25°C.
JYJUG	8	16,510	7/.0486	.146	9/64	4/64	.57	630	.654
JYJYK	6	26,250	7/.0612	.184	9/64	4/64	.61	710	.410
JYKAC	5	33,100	7/.0688	.206	9/64	4/64	.63	760	.326
JYKCA	4	41,740	7/.0772	.232	9/64	4/64	.66	820	.259
JYKDE	3	52,640	7/.0867	.260	9/64	4/64	.69	885	.205
JYKED	2	66,370	7/.0974	.292	9/64	4/64	.72	970	.162
JYKGO	1	83,690	19/.0664	.332	9/64	4/64	.76	1,070	.129
JYKIF	1/0	105,500	19/.0745	.373	9/64	4/64	.80	1,190	.102
JYKLY	2/0	133,100	19/.0837	.418	9/64	5/64	.88	1,530	.0811
JYKOG	3/0	167,800	19/.0940	.470	9/64	5/64	.93	1,720	.0642
JYKUH	4/0	211,600	19/.1055	.528	9/64	5/64	.99	1,940	.0509
JYKYL	...	250,000	37/.0822	.575	10/64	5/64	1.06	2,180	.0431
JYLAD	...	300,000	37/.0900	.630	10/64	5/64	1.12	2,420	.0360
JYLDA	...	350,000	37/.0973	.681	10/64	5/64	1.17	2,650	.0308
JYLEF	...	400,000	37/.1040	.728	10/64	6/64	1.25	3,180	.0270
JYLFE	...	500,000	37/.1162	.814	10/64	6/64	1.33	3,630	.0216
JYLHO	...	600,000	61/.0992	.893	10/64	6/64	1.41	4,090	.0180
JYLIG	...	700,000	61/.1071	.964	10/64	6/64	1.48	4,520	.0154
JYLMY	...	750,000	61/.1109	.998	10/64	6/64	1.52	4,730	.0144
JYLOH	...	800,000	61/.1145	1.031	10/64	6/64	1.55	4,940	.0135
JYLUJ	...	900,000	61/.1215	1.093	10/64	6/64	1.61	5,360	.0120
JYLYM	...	1,000,000	61/.1280	1.152	10/64	6/64	1.67	5,780	.0108
JYMAF	...	1,250,000	91/.1172	1.290	10/64	7/64	1.84	7,230	.00863
JYMEG	...	1,500,000	91/.1284	1.412	10/64	7/64	1.96	8,240	.00719
JYMFA	...	1,750,000	127/.1174	1.526	10/64	7/64	2.08	9,240	.00617
JYMGE	...	2,000,000	127/.1255	1.631	10/64	7/64	2.18	10,220	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR — 7,000 VOLTS

(Grounded Neutral)

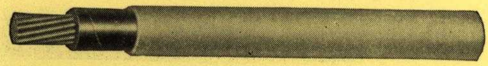
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C
OGGHE	6	26,250	7/.0612	.184	.155	.065	.63	725	.410
OGGIG	4	41,740	7/.0772	.232	.155	.065	.68	835	.259
OGGJA	2	66,370	7/.0974	.292	.155	.065	.74	985	.162
OGGOH	1	83,690	19/.0664	.332	.155	.065	.78	1,090	.129
OGGUJ	1/0	105,500	19/.0745	.373	.155	.065	.82	1,210	.102
OGGYK	2/0	133,100	19/.0837	.418	.155	.080	.89	1,560	.0811
OGHAF	3/0	167,800	19/.0940	.470	.155	.080	.94	1,750	.0642
OGHEG	4/0	211,600	19/.1055	.528	.155	.080	1.00	1,970	.0509
OGHIH	...	250,000	37/.0822	.575	.155	.080	1.05	2,170	.0431
OGHOJ	...	300,000	37/.0900	.630	.155	.080	1.10	2,410	.0360
OGHUK	...	350,000	37/.0973	.681	.155	.080	1.16	2,650	.0308
OGHYL	...	400,000	37/.1040	.728	.155	.080	1.20	2,880	.0270
OGIXY	...	500,000	37/.1162	.814	.155	.095	1.32	3,640	.0216
OGJAG	...	600,000	61/.0992	.893	.155	.095	1.40	4,090	.0180
OGJEH	...	750,000	61/.1109	.998	.155	.095	1.50	4,750	.0144
OGJIJ	...	1,000,000	61/.1280	1.152	.155	.095	1.66	5,820	.0108
OGJOK	...	1,250,000	91/.1172	1.290	.155	.110	1.82	7,280	.00863
OGJUL	...	1,500,000	91/.1284	1.412	.155	.110	1.95	8,330	.00719
OGJYM	...	1,750,000	127/.1174	1.526	.155	.110	2.06	9,360	.00617
OGKAH	...	2,000,000	127/.1255	1.631	.155	.110	2.17	10,360	.00539

SINGLE CONDUCTOR — 7,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OGKIK	6	26,250	7/.0612	.184	.170	.065	.66	765	.410
OGKLE	4	41,740	7/.0772	.232	.170	.065	.71	875	.259
OGKMA	2	66,370	7/.0974	.292	.170	.065	.77	1,030	.162
OGKOL	1	83,690	19/.0664	.332	.170	.065	.81	1,140	.129
OGKUM	1/0	105,500	19/.0745	.373	.170	.080	.88	1,470	.102
OGKYN	2/0	133,100	19/.0837	.418	.170	.080	.92	1,620	.0811
OGLAJ	3/0	167,800	19/.0940	.470	.170	.080	.97	1,800	.0642
OGLEK	4/0	211,600	19/.1055	.528	.170	.080	1.03	2,030	.0509
OGLIL	...	250,000	37/.0822	.575	.170	.080	1.08	2,230	.0431
OGLOM	...	300,000	37/.0900	.630	.170	.080	1.13	2,470	.0360
OGLUN	...	350,000	37/.0973	.681	.170	.080	1.19	2,710	.0308
OGLYP	...	400,000	37/.1040	.728	.170	.095	1.26	3,240	.0270
OGMAK	...	500,000	37/.1162	.814	.170	.095	1.35	3,710	.0216
OGMEL	...	600,000	61/.0992	.893	.170	.095	1.43	4,170	.0180
OGMIM	...	750,000	61/.1109	.998	.170	.095	1.53	4,830	.0144
OGMON	...	1,000,000	61/.1280	1.152	.170	.095	1.69	5,900	.0108
OGMUP	...	1,250,000	91/.1172	1.290	.170	.110	1.85	7,370	.00863
OGNAL	...	1,500,000	91/.1284	1.412	.170	.110	1.98	8,420	.00719
OGNEM	...	1,750,000	127/.1174	1.526	.170	.110	2.09	9,460	.00617
OGNIN	...	2,000,000	127/.1255	1.631	.170	.110	2.20	10,460	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR — 8,000 VOLTS

(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OCCUT	6	26,250	7/.0612	.184	.170	.065	.66	765	.410
OCCYV	4	41,740	7/.0772	.232	.170	.065	.71	875	.259
OCDER	2	66,370	7/.0974	.292	.170	.065	.77	1,030	.162
OCDIS	1	83,690	19/.0664	.332	.170	.065	.81	1,140	.129
OCDOT	1/0	105,500	19/.0745	.373	.170	.080	.88	1,470	.102
OCDUV	2/0	133,100	19/.0837	.418	.170	.080	.92	1,620	.0811
OCEFS	3/0	167,800	19/.0940	.470	.170	.080	.97	1,800	.0642
OCEGT	4/0	211,600	19/.1055	.528	.170	.080	1.03	2,030	.0509
OCEKY	...	250,000	37/.0822	.575	.170	.080	1.08	2,230	.0431
OCELZ	...	300,000	37/.0900	.630	.170	.080	1.13	2,470	.0360
OCEMB	...	350,000	37/.0973	.681	.170	.080	1.19	2,710	.0308
OCENC	...	400,000	37/.1040	.728	.170	.095	1.26	3,240	.0270
OCERG	...	500,000	37/.1162	.814	.170	.095	1.35	3,710	.0216
OCEVK	...	600,000	61/.0992	.893	.170	.095	1.43	4,170	.0180
OCEWL	...	750,000	61/.1109	.998	.170	.095	1.53	4,830	.0144
OCEZN	...	1,000,000	61/.1280	1.152	.170	.095	1.69	5,900	.0108
OCFAR	...	1,250,000	91/.1172	1.290	.170	.110	1.85	7,370	.00863
OCFES	...	1,500,000	91/.1284	1.412	.170	.110	1.98	8,420	.00719
OCFIT	...	1,750,000	127/.1174	1.526	.170	.110	2.09	9,460	.00617
OCFKE	...	2,000,000	127/.1255	1.631	.170	.110	2.20	10,460	.00539

SINGLE CONDUCTOR — 8,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Average Resistance Ohms/ 1,000′ @ 25°C.
OCFLA	6	26,250	7/.0612	.184	.190	.065	.70	825	.410
OCFOV	4	41,740	7/.0772	.232	.190	.065	.75	940	.259
OCFYX	2	66,370	7/.0974	.292	.190	.065	.81	1,100	.162
OCGAS	1	83,690	19/.0664	.332	.190	.080	.88	1,410	.129
OCGET	1/0	105,500	19/.0745	.373	.190	.080	.92	1,540	.102
OCGIV	2/0	133,100	19/.0837	.418	.190	.080	.96	1,690	.0811
OCGMA	3/0	167,800	19/.0940	.470	.190	.080	1.01	1,880	.0642
OCGUX	4/0	211,600	19/.1055	.528	.190	.080	1.07	2,110	.0509
OCHAT	...	250,000	37/.0822	.575	.190	.080	1.12	2,310	.0431
OCHEV	...	300,000	37/.0900	.630	.190	.080	1.17	2,550	.0360
OCHLO	...	350,000	37/.0973	.681	.190	.095	1.26	3,100	.0308
OCHME	...	400,000	37/.1040	.728	.190	.095	1.30	3,340	.0270
OCHNA	...	500,000	37/.1162	.814	.190	.095	1.39	3,810	.0216
OCHOY	...	600,000	61/.0992	.893	.190	.095	1.47	4,270	.0180
OCHUZ	...	750,000	61/.1109	.998	.190	.095	1.57	4,930	.0144
OCIFT	...	1,000,000	61/.1280	1.152	.190	.110	1.76	6,430	.0108
OCIJY	...	1,250,000	91/.1172	1.290	.190	.110	1.89	7,500	.00863
OCILB	...	1,500,000	91/.1284	1.412	.190	.110	2.02	8,550	.00719
OCIPF	...	1,750,000	127/.1174	1.526	.190	.110	2.13	9,590	.00617
OCJAV	...	2,000,000	127/.1255	1.631	.190	.125	2.27	11,150	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR — 10,000 VOLTS

(Grounded Neutral)

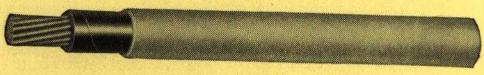
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000'	Average Resistance Ohms/1,000' @ 25°C.
OCJIX	4	41,740	7/.0772	.232	.190	.065	.75	940	.259
OCJOZ	2	66,370	7/.0974	.292	.190	.065	.81	1,100	.162
OCJUB	1	83,690	19/.0664	.332	.190	.080	.88	1,410	.129
OCKIZ	1/0	105,500	19/.0745	.373	.190	.080	.92	1,540	.102
OCKNO	2/0	133,100	19/.0837	.418	.190	.080	.96	1,690	.0811
OCKOB	3/0	167,800	19/.0940	.470	.190	.080	1.01	1,880	.0642
OCKPE	4/0	211,600	19/.1055	.528	.190	.080	1.07	2,110	.0509
OCKUC	...	250,000	37/.0822	.575	.190	.080	1.12	2,310	.0431
OCLAY	...	300,000	37/.0900	.630	.190	.080	1.17	2,550	.0360
OCLEZ	...	350,000	37/.0973	.681	.190	.095	1.26	3,100	.0308
OCLIB	...	400,000	37/.1040	.728	.190	.095	1.30	3,340	.0270
OCLOC	...	500,000	37/.1162	.814	.190	.095	1.39	3,810	.0216
OCLUD	...	600,000	61/.0992	.893	.190	.095	1.47	4,270	.0180
OCMAZ	...	750,000	61/.1109	.998	.190	.095	1.57	4,930	.0144
OCMEB	...	1,000,000	61/.1280	1.152	.190	.110	1.76	6,430	.0108
OCMIC	...	1,250,000	91/.1172	1.290	.190	.110	1.89	7,500	.00863
OCMOD	...	1,500,000	91/.1284	1.412	.190	.110	2.02	8,550	.00719
OCMUF	...	1,750,000	127/.1174	1.526	.190	.110	2.13	9,590	.00617
OCMYG	...	2,000,000	127/.1255	1.631	.190	.125	2.27	11,150	.00539

SINGLE CONDUCTOR — 10,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000'	Average Resistance Ohms/1,000' @ 25°C.
OCOCS	4	41,740	7/.0772	.232	.235	.080	.87	1,280	.259
OCODT	2	66,370	7/.0974	.292	.235	.080	.93	1,460	.162
OCOHY	1	83,690	19/.0664	.332	.235	.080	.97	1,580	.129
OCOLC	1/0	105,500	19/.0745	.373	.235	.080	1.01	1,710	.102
OCONF	2/0	133,100	19/.0837	.418	.235	.080	1.05	1,870	.0811
OCORJ	3/0	167,800	19/.0940	.470	.235	.080	1.10	2,060	.0642
OCOSK	4/0	211,600	19/.1055	.528	.235	.080	1.16	2,300	.0509
OCOWN	...	250,000	37/.0822	.575	.235	.080	1.21	2,500	.0431
OCPAC	...	300,000	37/.0900	.630	.235	.095	1.29	3,050	.0360
OCPED	...	350,000	37/.0973	.681	.235	.095	1.35	3,320	.0308
OCPIF	...	400,000	37/.1040	.728	.235	.095	1.39	3,560	.0270
OCPOG	...	500,000	37/.1162	.814	.235	.095	1.48	4,030	.0216
OCPUH	...	600,000	61/.0992	.893	.235	.095	1.56	4,510	.0180
OCPYJ	...	750,000	61/.1109	.998	.235	.095	1.66	5,180	.0144
OCRAF	...	1,000,000	61/.1280	1.152	.235	.110	1.85	6,710	.0108
OCREG	...	1,250,000	91/.1172	1.290	.235	.110	1.98	7,780	.00863
OCRIH	...	1,500,000	91/.1284	1.412	.235	.110	2.11	8,850	.00719
OCROJ	...	1,750,000	127/.1174	1.526	.235	.110	2.22	9,890	.00617
OCRUK	...	2,000,000	127/.1255	1.631	.235	.125	2.36	11,480	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR

12,000 VOLTS

(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance Ohms/1,000′ @ 25°C.
OCRYL	2	66,370	7/.0974	.292	.220	.080	.90	1,400	.162
OCSAG	1	83,690	19/.0664	.332	.220	.080	.94	1,520	.129
OCSEH	1/0	105,500	19/.0745	.373	.220	.080	.98	1,660	.102
OCSIJ	2/0	133,100	19/.0837	.418	.220	.080	1.02	1,810	.0811
OCSOK	3/0	167,800	19/.0940	.470	.220	.080	1.07	2,000	.0642
OCSUL	4/0	211,600	19/.1055	.528	.220	.080	1.13	2,230	.0509
OCSWO	...	250,000	37/.0822	.575	.220	.080	1.18	2,440	.0431
OCSYM	...	300,000	37/.0900	.630	.220	.095	1.26	2,980	.0360
OCSZA	...	350,000	37/.0973	.681	.220	.095	1.32	3,240	.0308
OCTAH	...	400,000	37/.1040	.728	.220	.095	1.36	3,490	.0270
OCTIK	...	500,000	37/.1162	.814	.220	.095	1.45	3,960	.0216
OCTOL	...	600,000	61/.0992	.893	.220	.095	1.53	4,420	.0180
OCTUM	...	750,000	61/.1109	.998	.220	.095	1.63	5,090	.0144
OCTYN	...	1,000,000	61/.1280	1.152	.220	.110	1.82	6,620	.0108
OCTZE	...	1,250,000	91/.1172	1.290	.220	.110	1.95	7,690	.00863
OCUBS	...	1,500,000	91/.1284	1.412	.220	.110	2.08	8,750	.00719
OCUCT	...	1,750,000	127/.1174	1.526	.220	.110	2.19	9,790	.00617
OCUGY	...	2,000,000	127/.1255	1.631	.220	.125	2.33	11,370	.00539

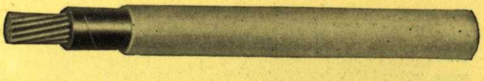
SINGLE CONDUCTOR

12,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance Ohms/1,000′ @ 25°C.
OCUHZ	2	66,370	7/.0974	.292	.250	.080	.96	1,510	.162
OCULD	1	83,690	19/.0664	.332	.250	.080	1.00	1,630	.129
OCUMF	1/0	105,500	19/.0745	.373	.250	.080	1.04	1,770	.102
OCUPH	2/0	133,100	19/.0837	.418	.250	.080	1.08	1,930	.0811
OCURK	3/0	167,800	19/.0940	.470	.250	.080	1.13	2,120	.0642
OCVAJ	4/0	211,600	19/.1055	.528	.250	.080	1.19	2,360	.0509
OCVEK	...	250,000	37/.0822	.575	.250	.095	1.27	2,870	.0431
OCVIL	...	300,000	37/.0900	.630	.250	.095	1.32	3,120	.0360
OCVOM	...	350,000	37/.0973	.681	.250	.095	1.38	3,390	.0308
OCVUN	...	400,000	37/.1040	.728	.250	.095	1.42	3,630	.0270
OCVYP	...	500,000	37/.1162	.814	.250	.095	1.51	4,110	.0216
OCWAK	...	600,000	61/.0992	.893	.250	.095	1.59	4,580	.0180
OCWEL	...	750,000	61/.1109	.998	.250	.095	1.69	5,260	.0144
OCWIM	...	1,000,000	61/.1280	1.152	.250	.110	1.88	6,800	.0108
OCWON	...	1,250,000	91/.1172	1.290	.250	.110	2.01	7,880	.00863
OCWUP	...	1,500,000	91/.1284	1.412	.250	.110	2.14	8,950	.00719
OCYAL	...	1,750,000	127/.1174	1.526	.250	.125	2.28	10,550	.00617
OCYCO	...	2,000,000	127/.1255	1.631	.250	.125	2.39	11,590	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



SINGLE CONDUCTOR — 15,000 VOLTS

(Grounded Neutral)

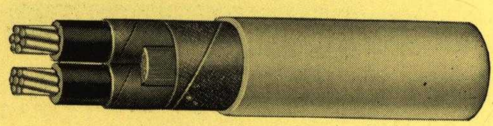
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance Ohms/1,000′ @ 25°C.
OCYDE	1	83,690	19/.0664	.332	.250	.080	1.00	1,630	.129
OCYEM	1/0	105,500	19/.0745	.373	.250	.080	1.04	1,770	.102
OCYFA	2/0	133,100	19/.0837	.418	.250	.080	1.08	1,930	.0811
OCYIN	3/0	167,800	19/.0940	.470	.250	.080	1.13	2,120	.0642
OCYOP	4/0	211,600	19/.1055	.528	.250	.080	1.19	2,360	.0509
OCZAM	...	250,000	37/.0822	.575	.250	.095	1.27	2,870	.0431
OCZEN	...	300,000	37/.0900	.630	.250	.095	1.32	3,120	.0360
OCZIP	...	350,000	37/.0973	.681	.250	.095	1.38	3,390	.0308
OCZUR	...	400,000	37/.1040	.728	.250	.095	1.42	3,630	.0270
OCZYS	...	500,000	37/.1162	.814	.250	.095	1.51	4,110	.0216
ODACK	...	600,000	61/.0992	.893	.250	.095	1.59	4,580	.0180
ODAGN	...	750,000	61/.1109	.998	.250	.095	1.69	5,260	.0144
ODALS	...	1,000,000	61/.1280	1.152	.250	.110	1.88	6,800	.0108
ODAMT	...	1,250,000	91/.1172	1.290	.250	.110	2.01	7,880	.00863
ODANV	...	1,500,000	91/.1284	1.412	.250	.110	2.14	8,950	.00719
ODARZ	...	1,750,000	127/.1174	1.526	.250	.125	2.28	10,550	.00617
ODASB	...	2,000,000	127/.1255	1.631	.250	.125	2.39	11,590	.00539

SINGLE CONDUCTOR — 15,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Average Resistance Ohms/1,000′ @ 25°C.
ODAVD	1	83,690	19/.0664	.332	.330	.080	1.16	1,950	.129
ODAWF	1/0	105,500	19/.0745	.373	.330	.080	1.20	2,100	.102
ODBAJ	2/0	133,100	19/.0837	.418	.330	.095	1.27	2,560	.0811
ODBEK	3/0	167,800	19/.0940	.470	.330	.095	1.32	2,770	.0642
ODBIL	4/0	211,600	19/.1055	.528	.330	.095	1.38	3,040	.0509
ODBOM	...	250,000	37/.0822	.575	.330	.095	1.43	3,260	.0431
ODBUN	...	300,000	37/.0900	.630	.330	.095	1.48	3,520	.0360
ODBYP	...	350,000	37/.0973	.681	.330	.095	1.54	3,800	.0308
ODCAK	...	400,000	37/.1040	.728	.330	.095	1.58	4,040	.0270
ODCEL	...	500,000	37/.1162	.814	.330	.095	1.67	4,530	.0216
ODCIM	...	600,000	61/.0992	.893	.330	.110	1.78	5,440	.0180
ODCON	...	750,000	61/.1109	.998	.330	.110	1.88	6,160	.0144
ODCUP	...	1,000,000	61/.1280	1.152	.330	.110	2.04	7,310	.0108
ODDAL	...	1,250,000	91/.1172	1.290	.330	.110	2.17	8,410	.00863
ODDEM	...	1,500,000	91/.1284	1.412	.330	.125	2.33	10,050	.00719
ODDGO	...	1,750,000	127/.1174	1.526	.330	.125	2.44	11,140	.00617
ODDHE	...	2,000,000	127/.1255	1.631	.330	.125	2.55	12,210	.00539

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



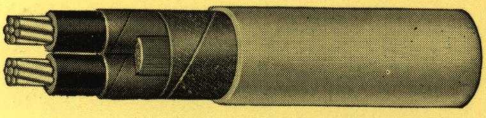
TWO CONDUCTOR—ROUND TYPE "VML" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resist-ance/ 1,000′ @ 25°C.
JYMJO	10	10,380	7/.0385	.116	3/64	Binder	3/64	.51	605	.103
JYMNY	8	16,510	7/.0486	.146	3/64	Binder	4/64	.61	730	.654
JYMOJ	6	26,250	7/.0612	.184	4/64	Binder	4/64	.77	970	.410
JYMUK	4	41,740	7/.0772	.232	4/64	Binder	5/64	.89	1,360	.259
JYMYN	3	52,640	7/.0867	.260	4/64	Binder	5/64	.95	1,520	.205
JYNAG	2	66,370	7/.0974	.292	4/64	Binder	5/64	1.01	1,700	.162
JYNGA	1	83,690	19/.0664	.332	5/64	Binder	5/64	1.15	2,040	.129
JYNHE	1/0	105,500	19/.0745	.373	5/64	Binder	6/64	1.27	2,600	.102
JYNIJ	2/0	133,100	19/.0837	.418	5/64	Binder	6/64	1.36	2,940	.0811
JYNKO	3/0	167,800	19/.0940	.470	5/64	Binder	6/64	1.46	3,350	.0642
JYNOK	4/0	211,600	19/.1055	.528	5/64	Binder	6/64	1.58	3,830	.0509
JYNPY	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.76	4,830	.0431
JYNUL	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.87	5,370	.0360
JYNYP	...	350,000	37/.0973	.681	6/64	Binder	7/64	1.97	5,900	.0308
JYOCY	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.07	6,430	.0270
JYODZ	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.27	7,980	.0216
JYOHD	...	600,000	61/.0992	.893	6/64	Binder	8/64	2.48	9,290	.0180
JYOJF	...	700,000	61/.1071	.964	6/64	Binder	8/64	2.62	10,290	.0154
JYONK	...	750,000	61/.1109	.998	6/64	Binder	8/64	2.69	10,790	.0144
JYORN	...	800,000	61/.1145	1.031	6/64	Binder	8/64	2.75	11,280	.0135
JYOSP	...	900,000	61/.1215	1.093	6/64	Binder	8/64	2.88	12,230	.0120
JYOWS	...	1,000,000	61/.1280	1.152	6/64	Binder	8/64	2.99	13,170	.0108

Binder
2/64
2/64
2/64
2/64

2/64
2/64

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



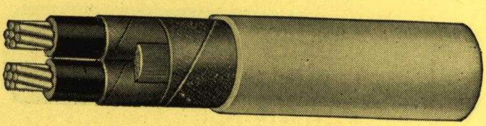
TWO CONDUCTOR—ROUND TYPE "VML-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
JYOXT	8	16,510	7/.0486	.146	4/64	Binder	4/64	.68	805	.654
JYPAH	6	26,250	7/.0612	.184	4/64	Binder	4/64	.77	970	.410
JYPHA	4	41,740	7/.0772	.232	4/64	Binder	5/64	.89	1,360	.259
JYPIK	2	66,370	7/.0974	.292	4/64	Binder	5/64	1.01	1,700	.162
JYPJE	1	83,690	19/.0664	.332	5/64	Binder	5/64	1.15	2,040	.129
JYPLO	1/0	105,500	19/.0745	.373	5/64	Binder	6/64	1.27	2,600	.102
JYPOL	2/0	133,100	19/.0837	.418	5/64	Binder	6/64	1.36	2,940	.0811
JYPUM	3/0	167,800	19/.0940	.470	5/64	Binder	6/64	1.46	3,350	.0642
JYRAK	4/0	211,600	19/.1055	.528	5/64	Binder	6/64	1.58	3,830	.0509
JYREL	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.76	4,830	.0431
JYRKA	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.87	5,370	.0360
JYRLE	...	350,000	37/.0973	.681	6/64	Binder	7/64	1.97	5,900	.0308
JYRNO	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.07	6,430	.0270
JYRON	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.26	8,330	.0216

TWO CONDUCTOR—ROUND TYPE "VML-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
JYRSY	8	16,510	7/.0486	.146	5/64	Binder	4/64	.74	870	.654
JYRUP	6	26,250	7/.0612	.184	5/64	Binder	4/64	.82	1,020	.410
JYRYS	4	41,740	7/.0772	.232	5/64	Binder	5/64	.94	1,160	.259
JYSAL	2	66,370	7/.0974	.292	5/64	Binder	5/64	1.06	1,800	.162
JYSEM	1	83,690	19/.0664	.332	6/64	Binder	5/64	1.20	2,080	.129
JYSLA	1/0	105,500	19/.0745	.373	6/64	Binder	6/64	1.32	2,740	.102
JYSME	2/0	133,100	19/.0837	.418	6/64	Binder	6/64	1.41	3,080	.0811
JYSOP	3/0	167,800	19/.0940	.470	6/64	Binder	6/64	1.51	3,490	.0642
JYSPO	4/0	211,600	19/.1055	.528	6/64	Binder	6/64	1.63	3,980	.0509
HYSTY	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.76	4,830	.0431
JYSYT	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.87	5,370	.0360
JYTAM	...	350,000	37/.0973	.681	6/64	Binder	7/64	1.97	5,900	.0308
JYTEN	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.07	6,430	.0270
JYTIP	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.26	8,330	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



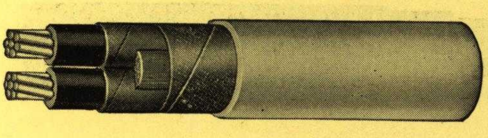
TWO CONDUCTOR—ROUND TYPE "VML-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
JYTMA	8	16,510	7/.0486	.146	5/64	2/64	4/64	.79	950	.654
JYTNE	6	26,250	7/.0612	.184	5/64	2/64	5/64	.90	1,320	.410
JYTUR	4	41,740	7/.0772	.232	5/64	2/64	5/64	1.00	1,570	.259
JYTVY	2	66,370	7/.0974	.292	5/64	2/64	5/64	1.12	1,920	.162
JYTYV	1	83,690	19/.0664	.332	6/64	2/64	5/64	1.26	2,280	.129
JYUBY	1/0	105,500	19/.0745	.373	6/64	2/64	6/64	1.37	2,880	.102
JYUGD	2/0	133,100	19/.0837	.418	6/64	2/64	6/64	1.46	3,230	.0811
JYULJ	3/0	167,800	19/.0940	.470	6/64	2/64	6/64	1.57	3,650	.0642
JYUMK	4/0	211,600	19/.1055	.528	6/64	2/64	6/64	1.68	4,150	.0509
JYURP	...	250,000	37/.0822	.575	6/64	2/64	7/64	1.81	5,020	.0431
JYUVS	...	300,000	37/.0900	.630	6/64	2/64	7/64	1.92	5,580	.0360
JYVAN	...	350,000	37/.0973	.681	6/64	2/64	7/64	2.02	6,120	.0308
JYVEP	...	400,000	37/.1040	.728	6/64	2/64	7/64	2.11	6,670	.0270
JYVNA	...	500,000	37/.1162	.814	6/64	2/64	8/64	2.32	8,240	.0216

TWO CONDUCTOR—ROUND TYPE "VML-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
JYVOR	8	16,510	7/.0486	.146	6/64	3/64	5/64	.92	1,310	.654
JYVPE	6	26,250	7/.0612	.184	6/64	3/64	5/64	.99	1,490	.410
JYVRO	4	41,740	7/.0772	.232	6/64	3/64	5/64	1.09	1,750	.259
JYVUS	2	66,370	7/.0974	.292	6/64	3/64	6/64	1.24	2,400	.162
JYVWY	1	83,690	19/.0664	.332	6/64	3/64	6/64	1.32	2,650	.129
JYWAP	1/0	105,500	19/.0745	.373	6/64	3/64	6/64	1.40	2,960	.102
JYWIR	2/0	133,100	19/.0837	.418	6/64	3/64	6/64	1.49	3,310	.0811
JYWOS	3/0	167,800	19/.0940	.470	6/64	3/64	6/64	1.60	3,730	.0642
JYWUT	4/0	211,600	19/.1055	.528	6/64	3/64	7/64	1.75	4,660	.0509
JYWYX	...	250,000	37/.0822	.575	6/64	3/64	7/64	1.84	5,110	.0431
JYZAR	...	300,000	37/.0900	.630	6/64	3/64	7/64	1.95	5,680	.0360
JYZIT	...	350,000	37/.0973	.681	6/64	3/64	7/64	2.05	6,230	.0308
JYZOV	...	400,000	37/.1040	.728	6/64	3/64	7/64	2.15	6,770	.0270
JYZRA	...	500,000	37/.1162	.814	6/64	3/64	8/64	2.35	8,350	.0216

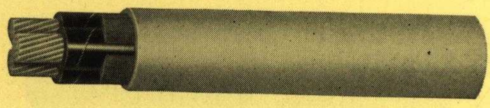
VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



TWO CONDUCTOR—ROUND TYPE "VML-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
JYZSE	8	16,510	7/.0486	.146	6/64	4/64	5/64	.95	1,370	.654
JYZVO	6	26,250	7/.0612	.184	6/64	4/64	5/64	1.03	1,550	.410
JYZYB	4	41,740	7/.0772	.232	6/64	4/64	5/64	1.12	1,810	.259
KAABT	2	66,370	7/.0974	.292	6/64	4/64	6/64	1.27	2,470	.162
KAAFY	1	83,690	19/.0664	.332	6/64	4/64	6/64	1.35	2,720	.129
KAAGZ	1/0	105,500	19/.0745	.373	6/64	4/64	6/64	1.44	3,030	.102
KAAHB	2/0	133,100	19/.0837	.418	6/64	4/64	6/64	1.53	3,390	.0811
KAAKD	3/0	167,800	19/.0940	.470	6/64	4/64	6/64	1.63	3,810	.0642
KAALF	4/0	211,600	19/.1055	.528	6/64	4/64	7/64	1.78	4,750	.0509
KAAMG	...	250,000	37/.0822	.575	7/64	4/64	7/64	1.93	5,370	.0431
KAARL	...	300,000	37/.0900	.630	7/64	4/64	7/64	2.04	5,950	.0360
KAASM	...	350,000	37/.0973	.681	7/64	4/64	7/64	2.14	6,500	.0308
KABAT	...	400,000	37/.1040	.728	7/64	4/64	8/64	2.27	7,600	.0270
KABEV	...	500,000	37/.1162	.814	7/64	4/64	8/64	2.44	8,670	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE

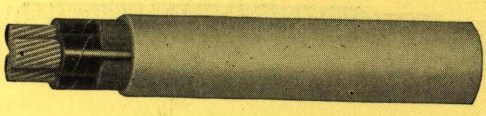


THREE CONDUCTOR **TYPE "VML"** **600 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance/1,000′ @25°C.
KABOY	10	10,380	7/.0385	.116	3/64	Binder	4/64	.58	670	1.03
KABTA	8	16,510	7/.0486	.146	3/64	Binder	4/64	.70	920	0.654
KABUZ	6	26,250	7/.0612	.184	4/64	Binder	4/64	.80	1,140	.410
KABVE	4	41,740	7/.0772	.232	4/64	Binder	5/64	.94	1,580	.259
KABYO	3	52,640	7/.0867	.260	4/64	Binder	5/64	1.00	1,780	.205
KACAV	2	66,370	7/.0974	.292	4/64	Binder	5/64	1.07	2,020	.162
KACIX	1	83,690	19/.0664	.332	5/64	Binder	6/64	1.27	2,740	.129
KACOZ	1/0	105,500	19/.0745	.373	5/64	Binder	6/64	1.34	3,110	.102
KACUB	2/0	133,100	19/.0837	.418	5/64	Binder	6/64	1.44	3,550	.0811
KACVA	3/0	167,800	19/.0940	.470	5/64	Binder	6/64	1.55	4,080	.0642
KACWE	4/0	211,600	19/.1055	.528	5/64	Binder	6/64	1.67	4,730	.0509
KACZO	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.87	5,900	.0431
KADBO	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.99	6,630	.0360
KADIZ	...	350,000	37/.0973	.681	6/64	Binder	7/64	2.10	7,350	.0308
KADOB	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.21	8,070	.0270
KADUC	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.42	9,990	.0216
KADWA	...	600,000	61/.0992	.893	6/64	Binder	8/64	2.59	11,790	.0180
KADYE	...	700,000	61/.1071	.964	6/64	Binder	8/64	2.74	13,170	.0154
KAEDY	...	750,000	61/.1109	.998	6/64	Binder	8/64	2.81	13,870	.0144
KAEJD	...	800,000	61/.1145	1.031	6/64	Binder	8/64	2.88	14,470	.0135
KAELG	...	900,000	61/.1215	1.093	6/64	Binder	8/64	3.02	15,270	.0120
KAENJ	...	1,000,000	61/.1280	1.152	6/64	Binder	9/64	3.18	17,970	.0108

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance/1,000′ @25°C.
KADUC	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.42	9,990	.0216
KADWA	...	600,000	61/.0992	.893	6/64	2/64	8/64	2.64	11,900	.0180
KADYE	...	700,000	61/.1071	.964	6/64	2/64	8/64	2.79	13,280	.0154
KAEDY	...	750,000	61/.1109	.998	6/64	2/64	8/64	2.87	13,990	.0144
KAEJD	...	800,000	61/.1145	1.031	6/64	2/64	8/64	2.94	14,660	.0135
KAELG	...	900,000	61/.1215	1.093	6/64	2/64	8/64	3.10	16,010	.0120
KAENJ	...	1,000,000	61/.1280	1.152	6/64	2/64	8/64	3.20	17,390	.0108

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



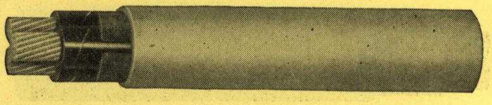
THREE CONDUCTOR TYPE "VML-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
KAEPK	8	16,510	7/.0486	.146	4/64	Binder	4/64	.72	920	.654
KAERM	6	26,250	7/.0612	.184	4/64	Binder	4/64	.80	1,140	.410
KAEWR	4	41,740	7/.0772	.232	4/64	Binder	5/64	.94	1,580	.259
KAEZT	2	66,370	7/.0974	.292	4/64	Binder	5/64	1.07	2,020	.162
KAFAY	1	83,690	19/.0664	.332	5/64	Binder	6/64	1.27	2,740	.129
KAFCO	1/0	105,500	19/.0745	.373	5/64	Binder	6/64	1.34	3,110	.102
KAFEZ	2/0	133,100	19/.0837	.418	5/64	Binder	6/64	1.44	3,550	.0811
KAFIB	3/0	167,800	19/.0940	.470	5/64	Binder	6/64	1.55	4,080	.0642
KAFOC	4/0	211,600	19/.1055	.528	5/64	Binder	6/64	1.67	4,730	.0509
KAFUD	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.87	5,900	.0431
KAFYA	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.99	6,630	.0360
KAFZE	...	350,000	37/.0973	.681	6/64	Binder	7/64	2.10	7,350	.0308
KAGAZ	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.21	8,070	.0270
KAGBE	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.42	9,990	.0216

THREE CONDUCTOR TYPE "VML-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance/ 1,000′ @25°C.
KAGDO	8	16,510	7/.0486	.146	5/64	Binder	4/64	.79	920	.654
KAGEB	6	26,250	7/.0612	.184	5/64	Binder	5/64	.90	1,400	.410
KAGGY	4	41,740	7/.0772	.232	5/64	Binder	5/64	1.00	1,700	.259
KAGIC	2	66,370	7/.0974	.292	5/64	Binder	5/64	1.13	2,130	.162
KAGOD	1	83,690	19/.0664	.332	6/64	Binder	6/64	1.32	3,000	.129
KAGUF	1/0	105,500	19/.0745	.373	6/64	Binder	6/64	1.41	3,270	.102
KAGYG	2/0	133,100	19/.0837	.418	6/64	Binder	6/64	1.51	3,710	.0811
KAGZA	3/0	167,800	19/.0940	.470	6/64	Binder	6/64	1.62	4,250	.0642
KAHAB	4/0	211,600	19/.1055	.528	6/64	Binder	7/64	1.77	5,310	.0509
KAHBA	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.87	5,900	.0431
KAHCE	...	300,000	37/.0900	.630	6/64	Binder	7/64	1.99	6,630	.0360
KAHEC	...	350,000	37/.0973	.681	6/64	Binder	7/64	2.10	7,350	.0308
KAHFO	...	400,000	37/.1040	.728	6/64	Binder	7/64	2.21	8,070	.0270
KAHID	...	500,000	37/.1162	.814	6/64	Binder	8/64	2.42	9,990	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



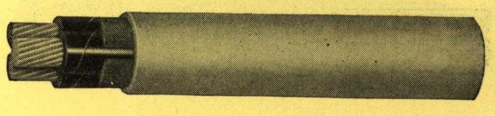
THREE CONDUCTOR TYPE "VML-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance/1,000′ @25°C.
KAHOF	8	16,510	7/.0486	.146	5/64	2/64	5/64	.87	1,280	.654
KAHUG	6	26,250	7/.0612	.184	5/64	2/64	5/64	.95	1,500	.410
KAHYH	4	41,740	7/.0772	.232	5/64	2/64	5/64	1.05	1,810	.259
KAICY	2	66,370	7/.0974	.292	5/64	2/64	5/64	1.19	2,250	.162
KAIJF	1	83,690	19/.0664	.332	6/64	2/64	6/64	1.38	3,120	.129
KAIRN	1/0	105,500	19/.0745	.373	6/64	2/64	6/64	1.46	3,400	.102
KAIXT	2/0	133,100	19/.0837	.418	6/64	2/64	6/64	1.56	3,850	.0811
KAJAC	3/0	167,800	19/.0940	.470	6/64	2/64	6/64	1.67	4,390	.0642
KAJCA	4/0	211,600	19/.1055	.528	6/64	2/64	7/64	1.83	5,490	.0509
KAJDE	...	250,000	37/.0822	.575	6/64	2/64	7/64	1.93	6,080	.0431
KAJED	...	300,000	37/.0900	.630	6/64	2/64	7/64	2.05	6,820	.0360
KAJGO	...	350,000	37/.0973	.681	6/64	2/64	7/64	2.16	7,540	.0308
KAJIF	...	400,000	37/.1040	.728	6/64	2/64	8/64	2.29	8,810	.0270
KAJOG	...	500,000	37/.1162	.814	6/64	2/64	8/64	2.47	10,200	.0216

THREE CONDUCTOR TYPE "VML-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance/1,000′ @25°C.
KAJUH	8	16,510	7/.0486	.146	6/64	3/64	5/64	.97	1,460	.654
KAJYJ	6	26,250	7/.0612	.184	6/64	3/64	5/64	1.05	1,680	.410
KAKAD	4	41,740	7/.0772	.232	6/64	3/64	5/64	1.16	2,000	.259
KAKDA	2	66,370	7/.0974	.292	6/64	3/64	6/64	1.32	2,770	.162
KAKEF	1	83,690	19/.0664	.332	6/64	3/64	6/64	1.40	3,100	.129
KAKFE	1/0	105,500	19/.0745	.373	6/64	3/64	6/64	1.49	3,480	.102
KAKHO	2/0	133,100	19/.0837	.418	6/64	3/64	6/64	1.59	3,930	.0811
KAKIG	3/0	167,800	19/.0940	.470	6/64	3/64	7/64	1.73	4,890	.0642
KAKOH	4/0	211,600	19/.1055	.528	6/64	3/64	7/64	1.86	5,580	.0509
KAKUJ	...	250,000	37/.0822	.575	6/64	3/64	7/64	1.96	6,180	.0431
KAKYK	...	300,000	37/.0900	.630	6/64	3/64	7/64	2.08	6,920	.0360
KALAF	...	350,000	37/.0973	.681	6/64	3/64	7/64	2.19	7,640	.0308
KALEG	...	400,000	37/.1040	.728	6/64	3/64	8/64	2.32	8,930	.0270
KALFA	...	500,000	37/.1162	.814	6/64	3/64	8/64	2.50	10,310	.0216

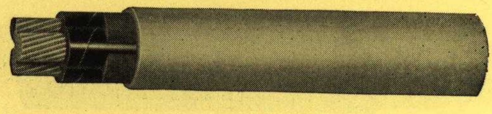
VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



THREE CONDUCTOR **TYPE "VML-50"** **5,000 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resist-ance/ 1,000′ @25°C.
KALGE	8	16,510	7/.0486	.146	6/64	4/64	5/64	1.00	1,520	.654
KALJO	6	26,250	7/.0612	.184	6/64	4/64	5/64	1.08	1,750	.410
KALLY	4	41,740	7/.0772	.232	6/64	4/64	5/64	1.19	2,070	.259
KALOJ	2	66,370	7/.0974	.292	6/64	4/64	6/64	1.35	2,840	.162
KALUK	1	83,690	19/.0664	.332	6/64	4/64	6/64	1.43	3,180	.129
KALYL	1/0	105,500	19/.0745	.373	6/64	4/64	6/64	1.52	3,560	.102
KAMAG	2/0	133,100	19/.0837	.418	6/64	4/64	6/64	1.62	4,010	.0811
KAMGA	3/0	167,800	19/.0940	.470	6/64	4/64	7/64	1.76	4,990	.0642
KAMHE	4/0	211,600	19/.1055	.528	6/64	4/64	7/64	1.89	5,680	.0509
KAMIJ	...	250,000	37/.0822	.575	7/64	4/64	7/64	2.05	6,470	.0431
KAMKO	...	300,000	37/.0900	.630	7/64	4/64	7/64	2.17	7,220	.0360
KAMMY	...	350,000	37/.0973	.681	7/64	4/64	8/64	2.31	8,500	.0308
KAMOK	...	400,000	37/.1040	.728	7/64	4/64	8/64	2.42	9,260	.0270
KAMUL	...	500,000	37/.1162	.814	7/64	4/64	8/64	2.60	10,660	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



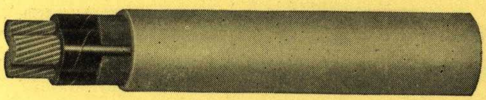
THREE CONDUCTOR—BELTED (Grounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over. all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
OGNOP	6	26,250	7/.0612	.184	.110	.080	.080	1.21	2,050	.410
OGNYR	4	41,740	7/.0772	.232	.110	.080	.095	1.35	2,730	.259
OGOGH	2	66,370	7/.0974	.292	.110	.080	.095	1.47	3,240	.162
OGOHJ	1	83,690	19/.0664	.332	.110	.080	.095	1.56	3,600	.129
OGOJK	1/0	105,500	19/.0745	.373	.110	.080	.095	1.65	4,020	.102
OGOLM	2/0	133,100	19/.0837	.418	.110	.080	.110	1.76	4,900	.0811
OGONP	3/0	167,800	19/.0940	.470	.110	.080	.110	1.87	5,510	.0642
OGORS	4/0	211,600	19/.1055	.528	.110	.080	.110	2.00	6,280	.0509
OGOST	...	250,000	37/.0822	.575	.110	.080	.110	2.11	6,940	.0431
OGOWY	...	300,000	37/.0900	.630	.110	.080	.110	2.21	7,690	.0360
OGOZB	...	350,000	37/.0973	.681	.110	.080	.125	2.37	9,100	.0308
OGPAM	...	400,000	37/.1040	.728	.110	.080	.125	2.46	9,870	.0270
OGPEN	...	500,000	37/.1162	.814	.110	.080	.125	2.67	11,340	.0216

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 7,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over- all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
OGPIP	6	26,250	7/.0612	.184	.110	.095	.095	1.27	2,420	.410
OGPRA	4	41,740	7/.0772	.232	.110	.095	.095	1.38	2,810	.259
OGPUR	2	66,370	7/.0974	.292	.110	.095	.095	1.50	3,310	.162
OGPYS	1	83,690	19/.0664	.332	.110	.095	.095	1.59	3,680	.129
OGSER	1/0	105,500	19/.0745	.373	.110	.095	.095	1.68	4,100	.102
OGSIS	2/0	133,100	19/.0837	.418	.110	.095	.110	1.79	4,990	.0811
OGSSO	3/0	167,800	19/.0940	.470	.110	.095	.110	1.90	5,610	.0642
OGSTE	4/0	211,600	19/.1055	.528	.110	.095	.110	2.03	6,370	.0509
OGSUV	...	250,000	37/.0822	.575	.110	.095	.110	2.14	7,040	.0431
OGSVA	...	300,000	37/.0900	.630	.110	.095	.125	2.27	8,340	.0360
OGTAR	...	350,000	37/.0973	.681	.110	.095	.125	2.40	9,210	.0308
OGTES	...	400,000	37/.1040	.728	.110	.095	.125	2.49	9,990	.0270
OGTIT	...	500,000	37/.1162	.814	.110	.095	.125	2.70	11,560	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



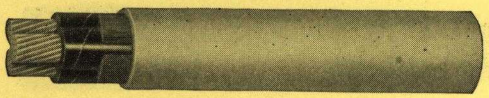
THREE CONDUCTOR—BELTED (Grounded Neutral) 8,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODDIN	6	26,250	7/.0612	.184	.110	.095	.095	1.27	2,420	.410
ODDJA	4	41,740	7/.0772	.232	.110	.095	.095	1.38	2,810	.259
ODDOP	2	66,370	7/.0974	.292	.110	.095	.095	1.50	3,310	.162
ODDYR	1	83,690	19/.0664	.332	.110	.095	.095	1.59	3,680	.129
ODEKS	1/0	105,500	19/.0745	.373	.110	.095	.095	1.68	4,100	.102
ODELT	2/0	133,100	19/.0837	.418	.110	.095	.110	1.79	4,990	.0811
ODEMV	3/0	167,800	19/.0940	.470	.110	.095	.110	1.90	5,610	.0642
ODEPY	4/0	211,600	19/.1055	.528	.110	.095	.110	2.03	6,370	.0509
ODERB	...	250,000	37/.0822	.575	.110	.095	.110	2.14	7,040	.0431
ODEWG	...	300,000	37/.0900	.630	.110	.095	.125	2.27	8,340	.0360
ODFAM	...	350,000	37/.0973	.681	.110	.095	.125	2.40	9,210	.0308
ODFEN	...	400,000	37/.1040	.728	.110	.095	.125	2.49	9,990	.0270
ODFIP	...	500,000	37/.1162	.814	.110	.095	.125	2.70	11,560	.0216

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 8,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODFUR	6	26,250	7/.0612	.184	.110	.110	.095	1.30	2,490	.410
ODFYS	4	41,740	7/.0772	.232	.110	.110	.095	1.41	2,880	.259
ODGAN	2	66,370	7/.0974	.292	.110	.110	.095	1.53	3,390	.162
ODGEP	1	83,690	19/.0664	.332	.110	.110	.095	1.62	3,760	.129
ODGLA	1/0	105,500	19/.0745	.373	.110	.110	.110	1.74	4,600	.102
ODGOR	2/0	133,100	19/.0837	.418	.110	.110	.110	1.82	5,080	.0811
ODGUS	3/0	167,800	19/.0940	.470	.110	.110	.110	1.93	5,700	.0642
ODGYT	4/0	211,600	19/.1055	.528	.110	.110	.110	2.06	6,470	.0509
ODHAP	...	250,000	37/.0822	.575	.110	.110	.110	2.17	7,140	.0431
ODHIR	...	300,000	37/.0900	.630	.110	.110	.125	2.30	8,450	.0360
ODHOS	...	350,000	37/.0973	.681	.110	.110	.125	2.43	9,320	.0308
ODHUT	...	400,000	37/.1040	.728	.110	.110	.125	2.52	10,100	.0270
ODHYV	...	500,000	37/.1162	.814	.110	.110	.125	2.73	11,680	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



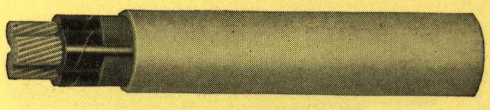
THREE CONDUCTOR—BELTED (Grounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODIJS	4	41,740	7/.0772	.232	.140	.095	.095	1.50	3,120	.259
ODIKT	2	66,370	7/.0974	.292	.140	.095	.095	1.63	3,660	.162
ODILV	1	83,690	19/.0664	.332	.140	.095	.110	1.75	4,450	.129
ODIPZ	1/0	105,500	19/.0745	.373	.140	.095	.110	1.83	4,880	.102
ODIRC	2/0	133,100	19/.0837	.418	.140	.095	.110	1.92	5,390	.0811
ODIZK	3/0	167,800	19/.0940	.470	.140	.095	.110	2.03	6,020	.0642
ODJER	4/0	211,600	19/.1055	.528	.140	.095	.110	2.16	6,810	.0509
ODJIS	...	250,000	37/.0822	.575	.140	.095	.125	2.29	8,010	.0431
ODJME	...	300,000	37/.0900	.630	.140	.095	.125	2.40	8,830	.0360
ODJNA	...	350,000	37/.0973	.681	.140	.095	.125	2.53	9,710	.0308
ODJOT	...	400,000	37/.1040	.728	.140	.095	.125	2.62	10,500	.0270
ODJUV	...	500,000	37/.1162	.814	.140	.095	.125	2.81	12,040	.0216

THREE CONDUCTOR—BELTED (Ungrounded Neutral) 10,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODKAR	4	41,740	7/.0772	.232	.140	.140	.095	1.59	3,350	.259
ODKES	2	66,370	7/.0974	.292	.140	.140	.110	1.75	4,320	.162
ODKIT	1	83,690	19/.0664	.332	.140	.140	.110	1.84	4,730	.129
ODKNE	1/0	105,500	19/.0745	.373	.140	.140	.110	1.92	5,160	.102
ODKOV	2/0	133,100	19/.0837	.418	.140	.140	.110	2.01	5,680	.0811
ODKPA	3/0	167,800	19/.0940	.470	.140	.140	.110	2.12	6,320	.0642
ODKYX	4/0	211,600	19/.1055	.528	.140	.140	.125	2.28	7,660	.0509
ODLAS	...	250,000	37/.0822	.575	.140	.140	.125	2.38	8,340	.0431
ODLET	...	300,000	37/.0900	.630	.140	.140	.125	2.49	9,170	.0360
ODLIV	...	350,000	37/.0973	.681	.140	.140	.125	2.62	10,060	.0308
ODLUX	...	400,000	37/.1040	.728	.140	.140	.125	2.71	10,860	.0270
ODMAT	...	500,000	37/.1162	.814	.140	.140	.125	2.90	12,410	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



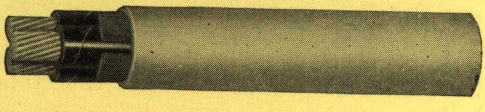
THREE CONDUCTOR—BELTED 12,000 VOLTS
(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODMEV	2	66,370	7/.0974	.292	.155	.110	.110	1.74	4,300	.162
ODMOY	1	83,690	19/.0664	.332	.155	.110	.110	1.83	4,710	.129
ODMUZ	1/0	105,500	19/.0745	.373	.155	.110	.110	1.92	5,170	.102
ODNAV	2/0	133,100	19/.0837	.418	.155	.110	.110	2.01	5,690	.0811
ODNIX	3/0	167,800	19/.0940	.470	.155	.110	.110	2.12	6,320	.0642
ODNOZ	4/0	211,600	19/.1055	.528	.155	.110	.125	2.27	7,640	.0509
ODNUB	...	250,000	37/.0822	.575	.155	.110	.125	2.38	8,340	.0431
ODOHS	...	300,000	37/.0900	.630	.155	.110	.125	2.49	9,180	.0360
ODOJT	...	350,000	37/.0973	.681	.155	.110	.125	2.61	10,040	.0308
ODONZ	...	400,000	37/.1040	.728	.155	.110	.125	2.71	10,860	.0270
ODORD	...	500,000	37/.1162	.814	.155	.110	.125	2.89	12,390	.0216

THREE CONDUCTOR—BELTED 12,000 VOLTS
(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
ODOSF	2	66,370	7/.0974	.292	.155	.155	.110	1.83	4,580	.162
ODOWJ	1	83,690	19/.0664	.332	.155	.155	.110	1.92	4,990	.129
ODPIZ	1/0	105,500	19/.0745	.373	.155	.155	.110	2.01	5,460	.102
ODPOB	2/0	133,100	19/.0837	.418	.155	.155	.110	2.10	5,980	.0811
ODPRO	3/0	167,800	19/.0940	.470	.155	.155	.110	2.21	6,630	.0642
ODPUC	4/0	211,600	19/.1055	.528	.155	.155	.125	2.36	7,970	.0509
ODSAB	...	250,000	37/.0822	.575	.155	.155	.125	2.47	8,690	.0431
ODSEC	...	300,000	37/.0900	.630	.155	.155	.125	2.58	9,530	.0360
ODSID	...	350,000	37/.0973	.681	.155	.155	.125	2.70	10,400	.0308
ODSOF	...	400,000	37/.1040	.728	.155	.155	.125	2.80	11,230	.0270
ODSUG	...	500,000	37/.1162	.814	.155	.155	.125	2.98	12,770	.0216

VARNISHED CAMBRIC INSULATED LEAD SHEATHED CABLE



THREE CONDUCTOR—BELTED 15,000 VOLTS

(Grounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
ODSVO	1	83,690	19/.0664	.332	.205	.110	.110	2.04	5,380	.129
ODSWE	1/0	105,500	19/.0745	.373	.205	.110	.110	2.13	5,850	.102
ODSYH	2/0	133,100	19/.0837	.418	.205	.110	.125	2.26	6,960	.0811
ODTAC	3/0	167,800	19/.0940	.470	.205	.110	.125	2.37	7,640	.0642
ODTED	4/0	211,600	19/.1055	.528	.205	.110	.125	2.49	8,470	.0509
ODTIF	...	250,000	37/.0822	.575	.205	.110	.125	2.60	9,200	.0431
ODTOG	...	300,000	37/.0900	.630	.205	.110	.125	2.71	10,050	.0360
ODTUH	...	350,000	37/.0973	.681	.205	.110	.125	2.82	10,900	.0308
ODTWO	...	400,000	37/.1040	.728	.205	.110	.125	2.92	11,740	.0270
ODTYJ	...	500,000	37/.1162	.814	.205	.110	.125	3.11	13,340	.0216

THREE CONDUCTOR—BELTED 15,000 VOLTS

(Ungrounded Neutral)

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
ODTZA	1	83,690	19/.0664	.332	.205	.205	.125	2.26	6,600	.129
ODUGS	1/0	105,500	19/.0745	.373	.205	.205	.125	2.35	7,070	.102
ODUHT	2/0	133,100	19/.0837	.418	.205	.205	.125	2.45	7,680	.0811
ODULY	3/0	167,800	19/.0940	.470	.205	.205	.125	2.56	8,370	.0642
ODUMZ	4/0	211,600	19/.1055	.528	.205	.205	.125	2.68	9,220	.0509
ODURF	...	250,000	37/.0822	.575	.205	.205	.125	2.79	9,960	.0431
ODUTH	...	300,000	37/.0900	.630	.205	.205	.125	2.90	10,830	.0360
ODUZM	...	350,000	37/.0973	.681	.205	.205	.125	3.01	11,720	.0308
ODVAD	...	400,000	37/.1040	.728	.205	.205	.125	3.11	12,570	.0270
ODVEF	...	500,000	37/.1162	.814	.205	.205	.140	3.33	15,000	.0216

RUBBER INSULATED POWER CABLES

Rubber insulated wires and cables have a wider adaptation to electrical circuits than any other type known today. Simplicity in handling and its resistance to moisture are important reasons for its popularity.

Canada Wire & Cable Co. manufactures a complete line of rubber insulated power cables for all the standard types of service, and for those uses which require special constructions to suit unusual conditions.

Several grades of rubber or rubber-like insulating compounds are available, those in common use being as follows:

CODE RUBBER

Fulfilling, with a wide margin of safety, the requirements of the Canadian Engineering Standards Association for Rubber Covered Wires and Cables.

CLASS AO (A.S.T.M.) RUBBER

A high grade rubber insulating compound meeting the physical, ageing, and electric requirements of A.S.T.M. Specification D-27. Is recommended for use on all important rubber insulated power, lighting, and control cables where the maximum copper operating temperature does not exceed 60°C (140°F), and the working pressure does not exceed 5,000 volts.

PERFORMANCE GRADE RUBBER

A high grade rubber compound very similar to grade AO rubber, but for which, in accordance with A.S.T.M. Specification D353-37T, chemical tests are omitted.

THERMAX RUBBER

A special rubber compound with outstanding temperature resistance and good physical and electrical properties. Suitable for use at a copper temperature of 70°C.,—a temperature which would cause rapid deterioration in ordinary rubber compounds. May be used as the insulation of braid or lead covered cables up to 5,000 volts working pressure, although for voltages above 2,000 a special construction is necessary.

GENCORONE

A rubber-like compound having extremely high dielectric strength and resistance to corona or ozone, in addition to

other general characteristics which ensure long life and reliability. These characteristics together with its inherent rubber-like properties such as its resistance to moisture, acids, and alkalis make Gencorone an ideal insulation for many special applications, particularly in the higher voltage range up to 15,000 volts.

NEOPRENE

A synthetic rubber-like compound which, when mixed with certain other ingredients has unusual oil-resisting and flame-retarding properties. Having a comparatively low insulation resistance, it is normally not used as an insulation, but has a very important application as an overall jacketting compound for portable cords, for use in the presence of oil, which would rapidly injure the usual rubber compounds. Its flame retarding properties are such that its use is particularly frequent in mines.

KOROSEAL

A non-inflammable synthetic resin, resistant to oil, water, acids, alkalis, sunlight, ozone and weathering, but is thermoplastic. This compound is partially transparent and can be made up in a series of bright distinguishing colours. Koroseal is just coming into use commercially and therefore its permissible applications are not fully determined.

For conduit installations in interior wiring, braid covered conductors may be used, but for underground installations, or where exposed to moisture it must be covered with a lead sheath.

The lead sheathed wire or cable may be pulled through conduits either underground or along walls, etc., if protection against mechanical injury is necessary, or if this protection is not necessary it may be itself clipped to walls or ceilings.

As an alternative to the use of conduit for mechanical protection, a steel armouring is frequently applied over the lead sheath in the factory, permitting the wire or cable to be buried directly in the ground, or trained along walls with no further protection.

See pages 20 to 25 for armouring.

INSULATION THICKNESSES—RUBBER INSULATED

SINGLE OR MULTI-CONDUCTOR

Rated Voltage Phase to Phase	Size of Conductor B. & S. or 1,000 C.M.	INSULATION THICKNESS Grounded Neutral, Inches	INSULATION THICKNESS Un-grounded Neutral, Inches
	14-9	3/64	3/64
	8-2	4/64	4/64
600	1-4/0	5/64	5/64
	213-500	6/64	6/64
	501-1,000	7/64	7/64
	Over 1,000	8/64	8/64
	14-8	4/64	4/64
	7-2	5/64	5/64
1,000	1-4/0	6/64	6/64
	213-500	7/64	7/64
	501-1,000	8/64	8/64
	Over 1,000	9/64	9/64
	14-8	5/64	5/64
	7-2	6/64	6/64
2,000	1-4/0	7/64	7/64
	213-500	8/64	8/64
	501-1,000	9/64	9/64
	Over 1,000	9/64	9/64
	14-8	7/64	7/64
3,000	7-4/0	8/64	8/64
	213-1,000	9/64	9/64
	Over 1,000	10/64	10/64
	14-4/0	9/64	9/64
4,000	213-1,000	10/64	10/64
	Over 1,000	11/64	11/64
	14-4/0	10/64	10/64
5,000	213-1,000	11/64	11/64
	Over 1,000	12/64	12/64
	14-4/0	10/64	12/64
6,000	213-1,000	11/64	12/64
	Over 1,000	12/64	13/64
	8-4/0	11/64	14/64
7,000	213-1,000	11/64	14/64
	Over 1,000	12/64	15/64
	8-4/0	12/64	16/64
8,000	213-1,000	12/64	16/64
	Over 1,000	13/64	17/64
	6-4/0	13/64	17/64
9,000	213-1,000	13/64	17/64
	Over 1,000	14/64	18/64
	6-4/0	14/64	18/64
10,000	213-1,000	14/64	18/64
	Over 1,000	15/64	19/64
	6-4/0	15/64	20/64
11,000	213-1,000	15/64	20/64
	Over 1,000	16/64	21/64
	6-4/0	16/64	22/64
12,000	213-1,000	16/64	22/64
	Over 1,000	17/64	23/64
	6-4/0	17/64	23/64
13,000	213-1,000	17/64	23/64
	Over 1,000	18/64	24/64
	6-4/0	18/64	25/64
14,000	213-1,000	18/64	25/64
	Over 1,000	19/64	26/64
	6-4/0	19/64	27/64
15,000	213-1,000	19/64	27/64
	Over 1,000	20/64	28/64

N.B.—We do not recommend Rubber Insulation for voltages over 5,000 volts except for very unusual conditions—in such cases 30% grade rubber or its equivalent should be used.

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—SOLID, SINGLE BRAID TYPE "R" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAAHG	14	4,107	.064	3/64	.188	.028	27	2.63
JAALK	12	6,530	.081	3/64	.205	.033	36	1.66
JAATS	10	10,380	.102	3/64	.232	.042	51	1.03
JAAVT	8	16,510	.128	4/64	.294	.068	82	0.647

SINGLE CONDUCTOR—STRANDED, SINGLE BRAID TYPE "R" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JABBE	14	4,107	7/.0242	.073	3/64	.197	.030	28	2.68
JABDO	12	6,530	7/.0305	.092	3/64	.216	.037	38	1.69
JABEB	10	10,380	7/.0385	.116	3/64	.246	.047	53	1.06
JABGY	8	16,510	7/.0486	.146	4/64	.312	.076	86	0.667

SINGLE CONDUCTOR—SOLID, DOUBLE BRAID TYPE "R" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JABUF	14	4,107	.064	3/64	.218	.037	31	2.63
JABYG	12	6,530	.081	3/64	.235	.043	41	1.66
JABZA	10	10,380	.102	3/64	.268	.056	58	1.03
JACAB	8	16,510	.128	4/64	.334	.088	92	0.647

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—STRANDED, DOUBLE BRAID TYPE "R" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JACEC	14	4,107	7/.0242	.073	3/64	.227	.040	35	2.68
JACFO	12	6,530	7/.0305	.092	3/64	.246	.047	43	1.69
JACHY	10	10,380	7/.0385	.116	3/64	.282	.062	61	1.06
JACID	8	16,510	7/.0486	.146	4/64	.352	.098	96	0.667
JACOF	6	26,250	7/.0612	.184	4/64	.370	.107	130	.420
JACUG	5	33,100	7/.0688	.206	4/64	.392	.120	155	.333
JACYH	4	41,740	7/.0772	.232	4/64	.418	.137	185	.264
JADAC	3	52,640	7/.0867	.260	4/64	.456	.163	230	.209
JADCA	2	66,370	7/.0974	.292	4/64	.488	.187	275	.166
JADDE	1	83,690	19/.0664	.332	5/64	.558	.244	355	.132
JADGO	1/0	105,500	19/.0745	.373	5/64	.599	.282	430	.105
JADIF	2/0	133,100	19/.0837	.418	5/64	.654	.336	530	.0828
JADJY	3/0	167,800	19/.0940	.470	5/64	.705	.390	650	.0656
JADOG	4/0	211,600	19/.1055	.528	5/64	.764	.458	795	.0516
JADUH	...	250,000	37/.0822	.575	6/64	.843	.558	950	.0440
JADYJ	...	300,000	37/.0900	.630	6/64	.898	.633	1,110	.0367
JAEXY	...	350,000	37/.0973	.681	6/64	.949	.707	1,290	.0315
JAFAD	...	400,000	37/.1040	.728	6/64	.996	.779	1,460	.0278
JAFDA	...	500,000	37/.1162	.814	6/64	1.08	.916	1,780	.0218
JAFEF	...	600,000	61/.0992	.893	7/64	1.21	1.15	2,160	.0184
JAFFE	...	700,000	61/.1071	.964	7/64	1.28	1.29	2,500	.0156
JAFHO	...	750,000	61/.1109	.998	7/64	1.32	1.37	2,670	.0146
JAFIG	...	800,000	61/.1145	1.031	7/64	1.34	1.41	2,830	.0136
JAFKY	...	900,000	61/.1215	1.093	7/64	1.43	1.61	3,180	.0121
JAFOH	...	1,000,000	61/.1280	1.152	7/64	1.49	1.74	3,500	.0109
JAFUJ	...	1,250,000	91/.1172	1.290	8/64	1.66	2.16	4,370	.00873
JAFYK	...	1,500,000	91/.1284	1.412	8/64	1.78	2.49	5,180	.00727
JAGAF	...	1,750,000	127/.1174	1.526	8/64	1.90	2.83	5,990	.00624
JAGEG	...	2,000,000	127/.1255	1.631	8/64	2.00	3.14	6,810	.00545

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—SOLID TYPE "R-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAGFA	14	4,107	.064	4/64	.246	.048	39	2.63
JAGGE	12	6,530	.081	4/64	.263	.054	49	1.66
JAGJO	10	10,380	.102	4/64	.284	.063	64	1.03
JAGOJ	8	16,510	.129	4/64	.314	.077	89	0.647

SINGLE CONDUCTOR—STRANDED TYPE "R-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAGUK	14	4,107	7/.0242	.073	4/64	.255	.051	41	2.68
JAGYL	12	6,530	7/.0305	.092	4/64	.274	.059	52	1.69
JAHAG	10	10,380	7/.0385	.116	4/64	.302	.072	69	1.06
JAHGA	8	16,510	7/.0486	.146	4/64	.332	.087	93	0.667
JAHHE	6	26,250	7/.0612	.184	5/64	.400	.126	140	.420
JAHIJ	5	33,100	7/.0688	.206	5/64	.422	.140	165	.333
JAHKO	4	41,740	7/.0772	.232	5/64	.458	.165	205	.264
JAHMY	3	52,640	7/.0867	.260	5/64	.486	.186	245	.209
JAHOK	2	66,370	7/.0974	.292	5/64	.518	.211	290	.166
JAHUL	1	83,690	19/.0664	.332	6/64	.590	.273	370	.132
JAIGH	1/0	105,500	19/.0745	.373	6/64	.641	.323	455	.105
JAIJK	2/0	133,100	19/.0837	.418	6/64	.686	.370	550	.0828
JAILM	3/0	167,800	19/.0940	.470	6/64	.738	.428	670	.0656
JAIRS	4/0	211,600	19/.1055	.528	6/64	.796	.498	820	.0516
JAIZB	...	250,000	37/.0822	.575	7/64	.873	.599	975	.0440
JAJAH	...	300,000	37/.0900	.630	7/64	.928	.676	1,150	.0367
JAJHA	...	350,000	37/.0973	.681	7/64	.979	.753	1,320	.0315
JAJIK	...	400,000	37/.1040	.728	7/64	1.026	.833	1,490	.0278
JAJLO	...	500,000	37/.1162	.814	7/64	1.112	.968	1,810	.0218
JAJOL	...	600,000	61/.0992	.893	8/64	1.243	1.21	2,200	.0184
JAJYN	...	700,000	61/.1071	.964	8/64	1.314	1.35	2,540	.0156
JAKAJ	...	750,000	61/.1109	.998	8/64	1.348	1.43	2,710	.0146
JAKEK	...	800,000	61/.1145	1.031	8/64	1.381	1.50	2,870	.0136
JAKJA	...	900,000	61/.1215	1.093	8/64	1.463	1.67	3,220	.0121
JAKMO	...	1,000,000	61/.1280	1.152	8/64	1.522	1.81	3,550	.0109
JAKPY	...	1,250,000	91/.1172	1.290	9/64	1.692	2.24	4,420	.00873
JAKYP	...	1,500,000	91/.1284	1.412	9/64	1.814	2.57	5,240	.00727
JALAK	...	1,750,000	127/.1174	1.526	9/64	1.928	2.93	6,050	.00624
JALEL	...	2,000,000	127/.1255	1.631	9/64	2.033	3.24	6,870	.00545

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—SOLID TYPE "R-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JALKA	14	4,107	.064	5/64	.276	.060	47	2.63
JALLE	12	6,530	.081	5/64	.297	.069	58	1.66
JALNO	10	10,380	.102	5/64	.318	.079	75	1.03
JALUP	8	16,510	.128	5/64	.344	.093	99	0.647

SINGLE CONDUCTOR—STRANDED TYPE "R-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAMAL	14	4,107	7/.0242	.073	5/64	.285	.064	49	2.68
JAMEM	12	6,530	7/.0305	.092	5/64	.308	.075	61	1.69
JAMLA	10	10,380	7/.0385	.116	5/64	.332	.087	78	1.06
JAMME	8	16,510	7/.0486	.146	5/64	.362	.103	105	0.667
JAMOP	6	26,250	7/.0612	.184	6/64	.432	.147	155	.420
JAMPO	5	33,100	7/.0688	.206	6/64	.464	.169	185	.333
JAMRY	4	41,740	7/.0772	.232	6/64	.490	.189	215	.264
JAMYR	3	52,640	7/.0867	.260	6/64	.518	.211	260	.209
JANAM	2	66,370	7/.0974	.292	6/64	.550	.238	310	.166
JANEM	1	83,690	19/.0664	.332	7/64	.630	.312	395	.132
JANIP	1/0	105,500	19/.0745	.373	7/64	.671	.354	475	.105
JANMA	2/0	133,100	19/.0837	.418	7/64	.716	.403	570	.0828
JANNE	3/0	167,800	19/.0940	.470	7/64	.768	.463	690	.0656
JANSY	4/0	211,600	19/.1055	.528	7/64	.826	.536	850	.0516
JANUR	...	250,000	37/.0822	.575	8/64	.905	.643	1,010	.0440
JANYS	...	300,000	37/.0900	.630	8/64	.960	.724	1,180	.0367
JAOBD	...	350,000	37/.0973	.681	8/64	1.011	.801	1,350	.0315
JAOCF	...	400,000	37/.1040	.728	8/64	1.058	.882	1,520	.0278
JAOHK	...	500,000	37/.1162	.814	8/64	1.144	1.02	1,850	.0218
JAOJL	...	600,000	61/.0992	.893	9/64	1.275	1.29	2,240	.0184
JAOLN	...	700,000	61/.1071	.964	9/64	1.346	1.43	2,580	.0156
JAORT	...	750,000	61/.1109	.998	9/64	1.380	1.50	2,750	.0146
JAOVY	...	800,000	61/.1145	1.031	9/64	1.433	1.61	2,940	.0136
JAOWZ	...	900,000	61/.1215	1.093	9/64	1.495	1.77	3,270	.0121
JAPEP	...	1,000,000	61/.1280	1.152	9/64	1.554	1.89	3,600	.0109
JAPNA	...	1,250,000	91/.1172	1.290	9/64	1.692	2.24	4,420	.00873
JAPOR	...	1,500,000	91/.1284	1.412	9/64	1.814	2.57	5,240	.00727
JAPRO	...	1,750,000	127/.1174	1.526	9/64	1.928	2.93	6,050	.00624
JAPUS	...	2,000,000	127/.1255	1.631	9/64	2.033	3.24	6,870	.00545

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—SOLID TYPE "R-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAPYT	14	4,107	.064	7/64	.342	.092	66	2.63
JARER	12	6,530	.081	7/64	.359	.101	78	1.66
JARRE	10	10,380	.102	7/64	.380	.113	96	1.03
JARTO	8	16,510	.128	7/64	.406	.129	120	0.647

SINGLE CONDUCTOR—STRANDED TYPE "R-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JARUV	14	4,107	7/.0242	.073	7/64	.351	.097	69	2.68
JARWY	12	6,530	7/.0305	.092	7/64	.370	.108	82	1.69
JASAR	10	10,380	7/.0385	.116	7/64	.394	.122	100	1.06
JASIT	8	16,510	7/.0486	.146	7/64	.424	.141	125	0.667
JASOV	6	26,250	7/.0612	.184	8/64	.504	.200	185	.420
JASRA	5	33,100	7/.0688	.206	8/64	.526	.217	215	.333
JASSE	4	41,740	7/.0772	.232	8/64	.552	.239	250	.264
JASVO	3	52,640	7/.0867	.260	8/64	.580	.264	290	.209
JASYX	2	66,370	7/.0974	.292	8/64	.622	.304	350	.166
JATAS	1	83,690	19/.0664	.332	8/64	.662	.344	415	.132
JATET	1/0	105,500	19/.0745	.373	8/64	.703	.388	495	.105
JATIV	2/0	133,100	19/.0837	.418	8/64	.748	.439	595	.0828
JATSA	3/0	167,800	19/.0940	.470	8/64	.800	.503	720	.0656
JATUX	4/0	211,600	19/.1055	.528	8/64	.858	.578	870	.0516
JATWO	...	250,000	37/.0822	.575	9/64	.937	.690	1,035	.0440
JAUHL	...	300,000	37/.0900	.630	9/64	.992	.773	1,210	.0367
JAUJM	...	350,000	37/.0973	.681	9/64	1.043	.850	1,380	.0315
JAULP	...	400,000	37/.1040	.728	9/64	1.090	.933	1,555	.0278
JAURV	...	500,000	37/.1162	.814	9/64	1.196	1.13	1,900	.0218
JAUVZ	...	600,000	61/.0992	.893	9/64	1.275	1.28	2,240	.0184
JAVAT	...	700,000	61/.1071	.964	9/64	1.346	1.43	2,580	.0156
JAVEV	...	750,000	61/.1109	.998	9/64	1.380	1.50	2,750	.0146
JAVOY	...	800,000	61/.1145	1.031	9/64	1.433	1.62	2,935	.0136
JAVUZ	...	900,000	61/.1215	1.093	9/64	1.495	1.76	3,270	.0121
JAVYO	...	1,000,000	61/.1280	1.152	9/64	1.554	1.89	3,600	.0109
JAWAV	...	1,250,000	91/.1172	1.290	10/64	1.722	2.32	4,470	.00873
JAWCY	...	1,500,000	91/.1284	1.412	10/64	1.844	2.66	5,290	.00727
JAWIX	...	1,750,000	127/.1174	1.526	10/64	1.958	3.01	6,110	.00624
JAWOZ	...	2,000,000	127/.1255	1.631	10/64	2.063	3.33	6,930	.00545

RUBBER INSULATED—BRAID COVERED CABLE

SINGLE CONDUCTOR—SOLID TYPE "R-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAWUB	14	4,107	.064	9/64	.406	.129	90	2.63
JAWVA	12	6,530	.081	9/64	.423	.141	105	1.66
JAWZO	10	10,380	.102	9/64	.454	.162	125	1.03
JAYBO	8	16,510	.128	9/64	.480	.181	155	0.647

SINGLE CONDUCTOR—STRANDED TYPE "R-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JAYFK	14	4,107	7/.0242	.073	9/64	.415	.135	95	2.68
JAYHM	12	6,530	7/.0305	.092	9/64	.434	.148	105	1.69
JAYIZ	10	10,380	7/.0385	.116	9/64	.468	.172	130	1.06
JAYGN	8	16,510	7/.0486	.146	9/64	.498	.195	160	0.667
JAYNS	6	26,250	7/.0612	.184	9/64	.536	.226	205	.420
JAYOB	5	33,100	7/.0688	.206	9/64	.558	.245	230	.333
JAYUC	4	41,740	7/.0772	.232	9/64	.584	.268	265	.264
JAYWA	3	52,640	7/.0867	.260	9/64	.622	.304	315	.209
JAYXD	2	66,370	7/.0974	.292	9/64	.654	.336	370	.166
JAZAY	1	83,690	19/.0664	.332	9/64	.694	.378	435	.132
JAZCO	1/0	105,500	19/.0745	.373	9/64	.735	.424	520	.105
JAZEZ	2/0	133,100	19/.0837	.418	9/64	.780	.478	620	.0828
JAZIB	3/0	167,800	19/.0940	.470	9/64	.832	.544	745	.0656
JAZOC	4/0	211,600	19/.1055	.528	9/64	.890	.622	900	.0516
JAZUD	...	250,000	37/.0822	.575	10/64	.967	.734	1,060	.0440
JAZYA	...	300,000	37/.0900	.630	10/64	1.022	.817	1,240	.0367
JAZZE	...	350,000	37/.0973	.681	10/64	1.073	.899	1,410	.0315
JEAHL	...	400,000	37/.1040	.728	10/64	1.120	.985	1,590	.0276
JEAJM	...	500,000	37/.1162	.814	10/64	1.226	1.17	1,940	.0218
JEALP	...	600,000	61/.0992	.893	10/64	1.305	1.33	2,280	.0184
JEAPS	...	700,000	61/.1071	.964	10/64	1.376	1.48	2,620	.0156
JEARV	...	750,000	61/.1109	.998	10/64	1.430	1.61	2,810	.0146
JEATY	...	800,000	61/.1145	1.031	10/64	1.463	1.68	2,980	.0136
JEAVZ	...	900,000	61/.1215	1.093	10/64	1.525	1.82	3,310	.0121
JEAWB	...	1,000,000	61/.1280	1.152	10/64	1.584	1.97	3,650	.0109
JEAZD	...	1,250,000	91/.1172	1.290	11/64	1.754	2.41	4,530	.00873
JEBFA	...	1,500,000	91/.1284	1.412	11/64	1.876	2.75	5,350	.00727
JEBGE	...	1,750,000	127/.1174	1.526	11/64	1.990	3.11	6,170	.00624
JEBJO	...	2,000,000	127/.1255	1.631	11/64	2.095	3.45	7,000	.00545

RUBBER INSULATED—BRAID COVERED CABLE

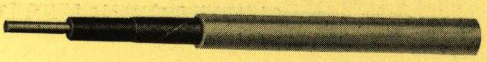
SINGLE CONDUCTOR—SOLID TYPE "R-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Square Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JEBLY	14	4,107	.064	10/64	.436	.149	100	2.63
JEBYL	12	6,530	.081	10/64	.463	.168	120	1.66
JECGA	10	10,380	.102	10/64	.484	.183	140	1.03
JECHE	8	16,510	.128	10/64	.510	.204	165	0.647

SINGLE CONDUCTOR—STRANDED TYPE "R-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Area Insulated Cond., Sq. Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JECKO	14	4,107	7/.0242	.073	10/64	.455	.163	110	2.68
JEDHA	12	6,530	7/.0305	.092	10/64	.474	.176	125	1.69
JEDJE	10	10,380	7/.0385	.116	10/64	.498	.195	145	1.06
JEDLO	8	16,510	7/.0486	.146	10/64	.520	.212	175	0.667
JEDNY	6	26,250	7/.0612	.184	10/64	.566	.251	220	.420
JEDYN	5	33,100	7/.0688	.206	10/64	.588	.271	250	.333
JEECH	4	41,740	7/.0772	.232	10/64	.624	.306	290	.264
JEEFK	3	52,640	7/.0867	.260	10/64	.652	.334	335	.209
JEEJN	2	66,370	7/.0974	.292	10/64	.684	.367	390	.166
JEENS	1	83,690	19/.0664	.332	10/64	.724	.412	455	.132
JEEPT	1/0	105,500	19/.0745	.373	10/64	.765	.460	540	.105
JEETZ	2/0	133,100	19/.0837	.418	10/64	.810	.515	640	.0828
JEEVB	3/0	167,800	19/.0940	.470	10/64	.862	.584	770	.0656
JEEXD	4/0	211,600	19/.1055	.528	10/64	.920	.665	925	.0516
JEFJA	...	250,000	37/.0822	.575	11/64	.999	.784	1,090	.0440
JEFKE	...	300,000	37/.0900	.630	11/64	1.054	.866	1,270	.0367
JEFMO	...	350,000	37/.0973	.681	11/64	1.105	.951	1,450	.0315
JEFYP	...	400,000	37/.1040	.728	11/64	1.152	1.04	1,630	.0278
JEGKA	...	500,000	37/.1162	.814	11/64	1.258	1.23	1,980	.0218
JEGLE	...	600,000	61/.0992	.893	11/64	1.337	1.39	2,320	.0184
JEGNO	...	700,000	61/.1071	.964	11/64	1.428	1.59	2,680	.0156
JEHLA	...	750,000	61/.1109	.998	11/64	1.462	1.68	2,860	.0146
JEHME	...	800,000	61/.1145	1.031	11/64	1.495	1.76	3,020	.0136
JEHPO	...	900,000	61/.1215	1.093	11/64	1.557	1.89	3,360	.0121
JEHYR	...	1,000,000	61/.1280	1.152	11/64	1.616	2.04	3,700	.0109
JEIGM	...	1,250,000	91/.1172	1.290	12/64	1.786	2.49	4,580	.00873
JEIJP	...	1,500,000	91/.1284	1.412	12/64	1.908	2.85	5,410	.00727
JEIRY	...	1,750,000	127/.1174	1.526	12/64	2.022	3.21	6,240	.00624
JEJMA	...	2,000,000	127/.1255	1.631	12/64	2.127	3.53	7,070	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE



SINGLE CONDUCTOR—SOLID TYPE "RL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JEJNE	14	4,107	.064	3/64	2/64	.25	130	2.63
JEJUR	12	6,530	.081	3/64	2/64	.27	150	1.66
JEJYS	10	10,380	.102	3/64	3/64	.33	255	1.03
JEKNA	8	16,510	.128	4/64	3/64	.39	330	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JEKOR	14	4,107	7/.0242	.073	3/64	2/64	.26	140	2.68
JEKPE	12	6,530	7/.0305	.092	3/64	2/64	.28	160	1.69
JEKRO	10	10,380	7/.0385	.116	3/64	3/64	.34	270	1.06
JEKUS	8	16,510	7/.0486	.146	4/64	3/64	.41	350	0.667
JEKYT	6	26,250	7/.0612	.184	4/64	4/64	.46	505	.420
JELIR	5	33,100	7/.0688	.206	4/64	4/64	.48	550	.333
JELOS	4	41,740	7/.0772	.232	4/64	4/64	.50	610	.264
JELPA	3	52,640	7/.0867	.260	4/64	4/64	.53	670	.209
JELSO	2	66,370	7/.0974	.292	4/64	4/64	.56	750	.166
JELUT	1	83,690	19/.0664	.332	5/64	4/64	.63	890	.132
JELVY	1/0	105,500	19/.0745	.373	5/64	4/64	.68	1,010	.105
JELYV	2/0	133,100	19/.0837	.418	5/64	4/64	.72	1,150	.0828
JEMER	3/0	167,800	19/.0940	.470	5/64	4/64	.77	1,310	.0656
JEMRE	4/0	211,600	19/.1055	.528	5/64	4/64	.83	1,510	.0516
JEMTO	...	250,000	37/.0822	.575	6/64	5/64	.94	1,960	.0440
JEMUV	...	300,000	37/.0900	.630	6/64	5/64	.99	2,190	.0367
JEMWY	...	350,000	37/.0973	.681	6/64	5/64	1.05	2,420	.0315
JENAR	...	400,000	37/.1040	.728	6/64	5/64	1.09	2,640	.0276
JENIT	...	500,000	37/.1162	.814	6/64	5/64	1.18	3,070	.0218
JENOV	...	600,000	61/.0992	.893	7/64	6/64	1.32	3,880	.0184
JENRA	...	700,000	61/.1071	.964	7/64	6/64	1.39	4,310	.0156
JENSE	...	750,000	61/.1109	.998	7/64	6/64	1.42	4,530	.0146
JENVO	...	800,000	61/.1145	1.031	7/64	6/64	1.46	4,740	.0136
JENYX	...	900,000	61/.1215	1.093	7/64	6/64	1.52	5,150	.0121
JEOCK	...	1,000,000	61/.1280	1.152	7/64	6/64	1.58	5,560	.0109
JEOGN	...	1,250,000	91/.1172	1.290	8/64	7/64	1.78	7,070	.00873
JEOLS	...	1,500,000	91/.1284	1.412	8/64	7/64	1.90	8,080	.00727
JEONV	...	1,750,000	127/.1174	1.526	8/64	7/64	2.01	9,070	.00624
JEORZ	...	2,000,000	127/.1255	1.631	8/64	7/64	2.12	10,060	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE

SINGLE CONDUCTOR—SOLID TYPE "RL-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JEOSB	14	4,107	.064	4/64	3/64	.30	220	2.63
JEOVD	12	6,530	.081	4/64	3/64	.32	245	1.66
JEOWF	10	10,380	.102	4/64	3/64	.34	275	1.03
JEPAS	8	16,510	.128	4/64	3/64	.37	315	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JEPET	14	4,107	7/.0242	.073	4/64	3/64	.31	230	2.68
JEPIV	12	6,530	7/.0305	.092	4/64	3/64	.33	255	1.69
JEPSA	10	10,380	7/.0385	.116	4/64	3/64	.36	285	1.06
JEPTE	8	16,510	7/.0486	.146	4/64	3/64	.39	330	0.667
JEPUX	6	26,250	7/.0612	.184	5/64	3/64	.45	425	.420
JEPWO	5	33,100	7/.0688	.206	5/64	3/64	.48	470	.333
JEPZY	4	41,740	7/.0772	.232	5/64	3/64	.50	520	.264
JERCY	3	52,640	7/.0867	.260	5/64	4/64	.56	715	.209
JEROZ	2	66,370	7/.0974	.292	5/64	4/64	.59	795	.166
JERUB	1	83,690	19/.0664	.332	6/64	4/64	.67	940	.132
JERVA	1/0	105,500	19/.0745	.373	6/64	4/64	.71	1,060	.105
JERWE	2/0	133,100	19/.0837	.418	6/64	4/64	.75	1,190	.0828
JERZO	3/0	167,800	19/.0940	.470	6/64	4/64	.80	1,360	.0656
JESBO	4/0	211,600	19/.1055	.528	6/64	5/64	.89	1,780	.0516
JESIZ	...	250,000	37/.0822	.575	7/64	5/64	.97	2,020	.0440
JESOB	...	300,000	37/.0900	.630	7/64	5/64	1.02	2,260	.0367
JESUC	...	350,000	37/.0973	.681	7/64	5/64	1.08	2,480	.0315
JESWA	...	400,000	37/.1040	.728	7/64	5/64	1.12	2,710	.0278
JESYE	...	500,000	37/.1162	.814	7/64	6/64	1.24	3,440	.0218
JETAY	...	600,000	61/.0992	.893	8/64	6/64	1.35	3,960	.0184
JETIB	...	700,000	61/.1071	.964	8/64	6/64	1.42	4,400	.0156
JETOC	...	750,000	61/.1109	.998	8/64	6/64	1.46	4,610	.0146
JETUD	...	800,000	61/.1145	1.031	8/64	6/64	1.49	4,820	.0136
JETYA	...	900,000	61/.1215	1.093	8/64	6/64	1.55	5,240	.0121
JETZE	...	1,000,000	61/.1280	1.152	8/64	6/64	1.61	5,650	.0109
JEVAZ	...	1,250,000	91/.1172	1.290	9/64	7/64	1.81	7,190	.00873
JEVBE	...	1,500,000	91/.1284	1.412	9/64	7/64	1.93	8,210	.00727
JEVDO	...	1,750,000	127/.1174	1.526	9/64	7/64	2.05	9,200	.00624
JEVEB	...	2,000,000	127/.1255	1.631	9/64	7/64	2.16	10,200	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE

SINGLE CONDUCTOR—SOLID TYPE "RL-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/1,000′	Average Resistance/1,000′ @ 25°C
JEVGY	14	4,107	.064	5/64	3/64	.33	250	2.63
JEVIC	12	6,530	.081	5/64	3/64	.35	270	1.66
JEVOD	10	10,380	.102	5/64	3/64	.37	305	1.03
JEVUF	8	16,510	.128	5/64	3/64	.40	345	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/1,000′	Average Resistance/1,000′ @ 25°C.
JEVYG	14	4,107	7/.0242	.073	5/64	3/64	.34	260	2.68
JEVZA	12	6,530	7/.0305	.092	5/64	3/64	.36	285	1.69
JEWAB	10	10,380	7/.0385	.116	5/64	3/64	.39	315	1.06
JEWBA	8	16,510	7/.0486	.146	5/64	3/64	.42	360	0.667
JEWCE	6	26,250	7/.0612	.184	6/64	3/64	.49	460	.420
JEWEC	5	33,100	7/.0688	.206	6/64	3/64	.51	505	.333
JEWFO	4	41,740	7/.0772	.232	6/64	4/64	.57	690	.264
JEWHY	3	52,640	7/.0867	.260	6/64	4/64	.59	760	.209
JEWID	2	66,370	7/.0974	.292	6/64	4/64	.63	840	.166
JEWOF	1	83,690	19/.0664	.332	7/64	4/64	.70	990	.132
JEWUG	1/0	105,500	19/.0745	.373	7/64	4/64	.74	1,110	.105
JEWYH	2/0	133,100	19/.0837	.418	7/64	4/64	.78	1,240	.0828
JEYCA	3/0	167,800	19/.0940	.470	7,64	5/64	.86	1,610	.0656
JEYDE	4/0	211,600	19/.1055	.528	7/64	5/64	.92	1,830	.0516
JEYGO	...	250,000	37/.0822	.575	8/64	5/64	1.00	2,090	.0440
JEYJS	...	300,000	37/.0900	.630	8/64	5/64	1.06	2,320	.0367
JEYKT	...	350,000	37/.0973	.681	8/64	5/64	1.11	2,550	.0315
JEYLV	...	400,000	37/.1040	.728	8/64	5/64	1.15	2,780	.0278
JEYZK	...	500,000	37/.1162	.814	8/64	6/64	1.27	3,520	.0218
JEZFE	...	600,000	61/.0992	.893	9/64	6/64	1.38	4,050	.0184
JEZKY	...	700,000	61/.1071	.964	9/64	6/64	1.45	4,490	.0156
JEZYK	...	750,000	61/.1109	.998	9/64	6/64	1.49	4,710	.0146
JIAKS	...	800,000	61/.1145	1.031	9/64	6/64	1.52	4,910	.0136
JIAMV	...	900,000	61/.1215	1.093	9/64	6/64	1.58	5,340	.0121
JIARB	...	1,000,000	61/.1280	1.152	9/64	6/64	1.64	5,740	.0109
JIASC	...	1,250,000	91/.1172	1.290	9/64	7/64	1.81	7,190	.00873
JIAWG	...	1,500,000	91/.1284	1.412	9/64	7/64	1.93	8,200	.00727
JIBAK	...	1,750,000	127/.1174	1.526	9/64	7/64	2.05	9,210	.00624
JIBEL	...	2,000,000	127/.1255	1.631	9/64	7/64	2.15	10,200	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE

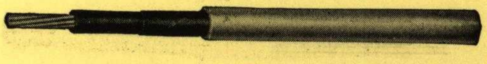
SINGLE CONDUCTOR—SOLID TYPE "RL-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thick-ness, Inches	Lead Thick-ness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JIBKA	14	4,107	.064	7/64	3/64	.40	320	2.63
JIBLE	12	6,530	.081	7/64	3/64	.41	335	1.66
JIBNO	10	10,380	.102	7/64	3/64	.43	370	1.03
JIBON	8	16,510	.128	7/64	3/64	.46	410	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Inches	Insula-tion Thick-ness, Ins.	Lead Thick-ness, Ins.	Over all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JIBUP	14	4,107	7/.0242	.073	7/64	3/64	.41	320	2.68
JICAL	12	6,530	7/.0305	.092	7/64	3/64	.42	350	1.69
JICEM	10	10,380	7/.0385	.116	7/64	3/64	.45	380	1.06
JICLA	8	16,510	7/.0486	.146	7/64	3/64	.48	430	0.667
JICOP	6	26,250	7/.0612	.184	8/64	4/64	.58	670	.420
JICPO	5	33,100	7/.0688	.206	8/64	4/64	.60	720	.333
JICRY	4	41,740	7/.0772	.232	8/64	4/64	.63	780	.264
JICYR	3	52,640	7/.0867	.260	8/64	4/64	.66	850	.209
JIDAM	2	66,370	7/.0974	.292	8/64	4/64	.69	930	.166
JIDEN	1	83,690	19/.0664	.332	8/64	4/64	.73	1,040	.132
JIDIP	1/0	105,500	19/.0745	.373	8/64	4/64	.77	1,160	.105
JIDMA	2/0	133,100	19/.0837	.418	8/64	4/64	.81	1,300	.0828
JIDNE	3/0	167,800	19/.0940	.470	8/64	5/64	.90	1,680	.0656
JIDSY	4/0	211,600	19/.1055	.528	8/64	5/64	.95	1,900	.0516
JIDUR	...	250,000	37/.0822	.575	9/64	5/64	1.03	2,150	.0440
JIDYS	...	300,000	37/.0900	.630	9/64	5/64	1.09	2,390	.0367
JIEJS	...	350,000	37/.0973	.681	9/64	5/64	1.14	2,620	.0315
JIEKT	...	400,000	37/.1040	.728	9/64	5/64	1.19	2,850	.0278
JIELV	...	500,000	37/.1162	.814	9/64	6/64	1.30	3,600	.0218
JIENY	...	600,000	61/.0992	.893	9/64	6/64	1.38	4,040	.0184
JIEPZ	...	700,000	61/.1071	.964	9/64	6/64	1.45	4,480	.0156
JIERC	...	750,000	61/.1109	.998	9/64	6/64	1.49	4,710	.0146
JIEVG	...	800,000	61/.1145	1.031	9/64	6/64	1.52	4,920	.0136
JIEZK	...	900,000	61/.1215	1.093	9/64	6/64	1.58	5,340	.0121
JIFAN	...	1,000,000	61/.1280	1.152	9/64	6/64	1.64	5,750	.0109
JIFEP	...	1,250,000	91/.1172	1.290	10/64	7/64	1.84	7,290	.00873
JIFNA	...	1,500,000	91/.1284	1.412	10/64	7/64	1.96	8,310	.00727
JIFOR	...	1,750,000	127/.1174	1.526	10/64	7/64	2.08	9,310	.00624
JIFPE	...	2,000,000	127/.1255	1.631	10/64	7/64	2.18	10,310	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE



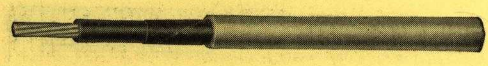
SINGLE CONDUCTOR—SOLID TYPE "RL-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JIFRO	14	4,107	.064	9/64	3/64	.46	380	2.63
JIFTY	12	6,530	.081	9/64	3/64	.48	405	1.66
JIFUS	10	10,380	.102	9/64	3/64	.50	440	1.03
JIFYT	8	16,510	.128	9/64	4/64	.56	620	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Inches	Insulation Thickness, Ins.	Lead Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resistance/ 1,000′ @ 25°C.
JIGAP	14	4,107	7/.0242	.073	9/64	3/64	.47	390	2.68
JIGIR	12	6,530	7/.0305	.092	9/64	3/64	.49	420	1.69
JIGOS	10	10,380	7/.0385	.116	9/64	3/64	.51	455	1.06
JIGPA	8	16,510	7/.0486	.146	9/64	4/64	.57	645	0.667
JIGSO	6	26,250	7/.0612	.184	9/64	4/64	.61	720	.420
JIGUT	5	33,100	7/.0688	.206	9/64	4/64	.63	770	.333
JIGVY	4	41,740	7/.0772	.232	9/64	4/64	.66	830	.264
JIGYV	3	52,640	7/.0867	.260	9/64	4/64	.69	900	.209
JIHER	2	66,370	7/.0974	.292	9/64	4/64	.72	985	.166
JIHRE	1	83,690	19/.0664	.332	9/64	4/64	.76	1,090	.132
JIHTO	1/0	105,500	19/.0745	.373	9/64	4/64	.80	1,210	.105
JIHUV	2/0	133,100	19/.0837	.418	9/64	5/64	.88	1,550	.0828
JIHWY	3/0	167,800	19/.0940	.470	9/64	5/64	.93	1,740	.0656
JIJAR	4/0	211,600	19/.1055	.528	9/64	5/64	.99	1,960	.0516
JIJIT	...	250,000	37/.0822	.575	10/64	5/64	1.06	2,110	.0440
JIJOV	...	300,000	37/.0900	.630	10/64	5/64	1.12	2,460	.0367
JIJRA	...	350,000	37/.0973	.681	10/64	5/64	1.17	2,690	.0315
JIJSE	...	400,000	37/.1040	.728	10/64	6/64	1.25	3,220	.0278
JIJVO	...	500,000	37/.1162	.814	10/64	6/64	1.33	3,680	.0218
JIJYX	...	600,000	61/.0992	.893	10/64	6/64	1.41	4,130	.0184
JIKAS	...	700,000	61/.1071	.964	10/64	6/64	1.48	4,570	.0156
JIKET	...	750,000	61/.1109	.998	10/64	6/64	1.52	4,790	.0146
JIKIV	...	800,000	61/.1145	1.031	10/64	6/64	1.55	5,000	.0136
JIKSA	...	900,000	61/.1215	1.093	10/64	6/64	1.61	5,420	.0121
JIKTE	...	1,000,000	61/.1280	1.152	10/64	6/64	1.67	5,830	.0109
JIKUX	...	1,250,000	91/.1172	1.290	11/64	7/64	1.87	7,400	.00873
JIKWO	...	1,500,000	91/.1284	1.412	11/64	7/64	1.99	8,420	.00727
JIKZY	...	1,750,000	127/.1174	1.526	11/64	7/64	2.11	9,430	.00624
JILAT	...	2,000,000	127/.1255	1.631	11/64	7/64	2.21	10,420	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE



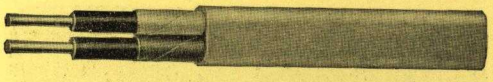
SINGLE CONDUCTOR—SOLID TYPE "RL-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thick-ness, Inches	Lead Thick-ness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JILEV	14	4,107	.064	10/64	3/64	.49	415	2.63
JILOY	12	6,530	.081	10/64	3/64	.51	440	1.66
JILTA	10	10,380	.102	10/64	4/64	.56	610	1.03
JILUZ	8	16,510	.128	10/64	4/64	.59	660	0.647

SINGLE CONDUCTOR—STRANDED TYPE "RL-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing	Diam. Bare Cond., Inches	Insula-tion Thick-ness, Ins.	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JILVE	14	4,107	7/.0242	.073	10/64	3/64	.50	425	2.68
JILYO	12	6,530	7/.0305	.092	10/64	3/64	.52	450	1.69
JIMAV	10	10,380	7/.0385	.116	10/64	4/64	.57	630	1.06
JIMCY	8	16,510	7/.0486	.146	10/64	4/64	.60	685	0.667
JIMIX	6	26,250	7/.0612	.184	10/64	4/64	.64	765	.420
JIMOZ	5	33,100	7/.0688	.206	10/64	4/64	.66	815	.333
JIMUB	4	41,740	7/.0772	.232	10/64	4/64	.69	880	.264
JIMVA	3	52,640	7/.0867	.260	10/64	4/64	.72	950	.209
JIMWE	2	66,370	7/.0974	.292	10/64	4/64	.75	1,030	.166
JIMZO	1	83,690	19/.0664	.332	10/64	4/64	.79	1,140	.132
JINBO	1/0	105,500	19/.0745	.373	10/64	5/64	.86	1,460	.105
JINIZ	2/0	133,100	19/.0837	.418	10/64	5/64	.91	1,610	.0828
JINOB	3/0	167,800	19/.0940	.470	10/64	5/64	.96	1,800	.0656
JINUC	4/0	211,600	19/.1055	.528	10/64	5/64	1.02	2,030	.0516
JINYE	...	250,000	37/.0822	.575	11/64	5/64	1.10	2,290	.0440
JIOGS	...	300,000	37/.0900	.630	11/64	5/64	1.15	2,530	.0367
JIOHT	...	350,000	37/.0973	.681	11/64	5/64	1.20	2,760	.0315
JIOLY	...	400,000	37/.1040	.728	11/64	6/64	1.28	3,310	.0276
JIONB	...	500,000	37/.1162	.814	11/64	6/64	1.37	3,760	.0218
JIORF	...	600,000	61/.0992	.893	11/64	6/64	1.45	4,220	.0184
JIOWK	...	700,000	61/.1071	.964	11/64	6/64	1.52	4,660	.0156
JIOZM	...	750,000	61/.1109	.998	11/64	6/64	1.55	4,880	.0146
JIPAY	...	800,000	61/.1145	1.031	11/64	6/64	1.58	5,090	.0136
JIPCO	...	900,000	61/.1215	1.093	11/64	6/64	1.65	5,510	.0121
JIPEZ	...	1,000,000	61/.1280	1.152	11/64	6/64	1.73	6,340	.0109
JIPIB	...	1,250,000	91/.1172	1.290	12/64	7/64	1.90	7,500	.00873
JIPOC	...	1,500,000	91/.1284	1.412	12/64	7/64	2.03	8,530	.00727
JIPUD	...	1,750,000	127/.1174	1.526	12/64	7/64	2.14	9,530	.00624
JIPYA	...	2,000,000	127/.1255	1.631	12/64	7/64	2.28	11,090	.00545

RUBBER INSULATED—LEAD SHEATHED CABLE



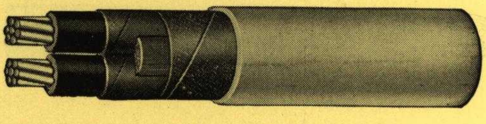
FLAT DUPLEX—SOLID TYPE "RDL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Dimensions, Inches Long	Overall Dimensions, Inches Short	Net Weight Pounds/1,000′	Average Resistance/1,000′ @ 25°C.
JIRFO	14	4,107	.064	3/64	2/64	.44	.25	215	2.63
JIRHY	12	6,530	.081	3/64	3/64	.50	.30	350	1.66
JIRID	10	10,380	.102	3/64	3/64	.56	.33	415	1.03
JIROF	8	16,510	.128	4/64	3/64	.68	.39	550	0.647

FLAT DUPLEX—STRANDED TYPE "RDL" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding Each Conductor	Diam. Bare Cond., Inches	Insulation Thickness, Inches	Lead Thickness, Inches	Overall Dimensions Inches Long	Overall Dimensions Inches Short	Net Weight Pounds/1,000′	Average Resistance/1,000′ @ 25°C.
JIPZE	14	4,107	7/.0242	.073	3/64	2/64	.46	.26	225	2.68
JIRAB	12	6,530	7/.0305	.092	3/64	3/64	.53	.31	370	1.69
JIRBA	10	10,380	7/.0385	.116	3/64	3/64	.59	.34	435	1.06
JIRCE	8	16,510	7/.0486	.146	4/64	3/64	.72	.41	595	0.667
JIREC	6	26,250	7/.0612	.184	4/64	4/64	.87	.49	900	.420

RUBBER INSULATED—LEAD SHEATHED CABLE



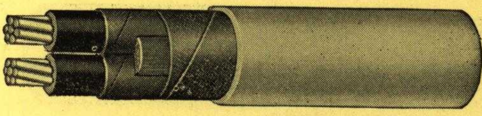
TWO CONDUCTOR, ROUND—SOLID TYPE "RML" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
JIULZ	14	4,107	.064	3/64	Binder	2/64	.46	285	2.63
JIUMB	12	6,530	.081	3/64	Binder	3/64	.54	450	1.66
JIURG	10	10,380	.102	3/64	Binder	3/64	.58	525	1.03
JIUSH	8	16,510	.128	4/64	Binder	3/64	.70	695	0.647

TWO CONDUCTOR, ROUND—STRANDED TYPE "RML" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing, Each Con-ductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resist-ance/ 1,000′ @ 25°C.
JIRUG	14	4,107	7/.0242	.073	3/64	Binder	2/64	.48	305	2.68
JIRYH	12	6,530	7/.0305	.092	3/64	Binder	3/64	.56	480	1.69
JISAC	10	10,380	7/.0385	.116	3/64	Binder	3/64	.61	565	1.06
JISCA	8	16,510	7/.0486	.146	4/64	Binder	3/64	.74	745	0.667
JISDE	6	26,250	7/.0612	.184	4/64	Binder	4/64	.81	1,050	.420
JISED	4	41,740	7/.0772	.232	4/64	Binder	4/64	.90	1,250	.264
JISGO	3	52,640	7/.0867	.260	4/64	Binder	4/64	.96	1,390	.209
JISIF	2	66,370	7/.0974	.292	4/64	Binder	4/64	1.02	1,560	.166
JISJY	1	83,690	19/.0664	.332	5/64	Binder	5/64	1.19	2,130	.132
JISOG	1/0	105,500	19/.0745	.373	5/64	Binder	5/64	1.27	2,420	.105
JISUH	2/0	133,100	19/.0837	.418	5/64	Binder	5/64	1.36	2,740	.0828
JISYJ	3/0	167,800	19/.0940	.470	5/64	Binder	5/64	1.46	3,110	.0656
JITAD	4/0	211,600	19/.1055	.528	5/64	Binder	5/64	1.58	3,600	.0516
JITDA	...	250,000	37/.0822	.575	6/64	Binder	6/64	1.77	4,590	.0440
JITEF	...	300,000	37/.0900	.630	6/64	Binder	6/64	1.88	5,120	.0367
JITHO	...	350,000	37/.0973	.681	6/64	Binder	6/64	1.99	5,630	.0315
JITIG	...	400,000	37/.1040	.728	6/64	Binder	6/64	2.08	6,150	.0278
JITOH	...	500,000	37/.1162	.814	6/64	Binder	6/64	2.25	7,110	.0218
JITUJ	...	600,000	61/.0992	.893	7/64	Binder	8/64	2.53	9,460	.0184
JITYK	...	700,000	61/.1071	.964	7/64	Binder	8/64	2.67	10,470	.0156
JIUFS	...	750,000	61/.1109	.998	7/64	Binder	8/64	2.74	10,970	.0146
JIUGT	...	800,000	61/.1145	1.031	7/64	Binder	8/64	2.81	11,450	.0136
JIUHV	...	900,000	61/.1215	1.093	7/64	Binder	8/64	2.93	12,410	.0121
JIUKY	...	1,000,000	61/.1280	1.152	7/64	Binder	8/64	3.05	13,360	.0109

RUBBER INSULATED—LEAD SHEATHED CABLE



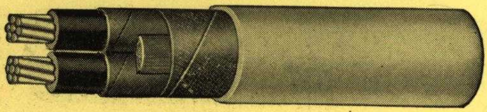
TWO CONDUCTOR—ROUND TYPE "RML-10" 1,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance/1,000′ @ 25°C
JIUVK	8	16,510	7/.0486	.146	4/64	Binder	4/64	.73	870	.667
JIUZN	6	26,250	7/.0612	.184	5/64	Binder	5/64	.90	1,330	.420
JIVAF	4	41,740	7/.0772	.232	5/64	Binder	5/64	.99	1,570	.264
JIVFA	2	66,370	7/.0974	.292	5/64	Binder	5,64	1.12	1,920	.166
JIVGE	1	83,690	19/.0664	.332	6/64	Binder	6/64	1.29	2,630	.132
JIVJO	1/0	105,500	19/.0745	.373	6/64	Binder	6/64	1.37	2,890	.105
JIVOJ	2/0	133,100	19/.0837	.418	6/64	Binder	6/64	1.46	3,240	.0828
JIVUK	3/0	167,800	19/.0940	.470	6,64	Binder	6/64	1.56	3,660	.0656
JIVYL	4/0	211,600	19/.1055	.528	6/64	Binder	6/64	1.68	4,160	.0516
JIWAG	...	250,000	37/.0822	.575	7/64	Binder	7/64	1.86	5,180	.0440
JIWHE	...	300,000	37/.0900	.630	7,64	Binder	7/64	1.97	5,740	.0367
JIWIJ	...	350,000	37/.0973	.681	7/64	Binder	7/64	2.08	6,280	.0315
JIWOK	...	400,000	37/.1040	.728	7,64	Binder	7/64	2.17	6,830	.0276
JIWUL	...	500,000	37/.1162	.814	7/64	Binder	7/64	2.37	8,420	.0218

TWO CONDUCTOR—ROUND TYPE "RML-20" 2,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance/1,000′ @ 25°C.
JIYAH	8	16,510	7/.0486	.146	5/64	Binder	4/64	.79	960	.667
JIYDS	6	26,250	7/.0612	.184	6/64	Binder	5/64	.96	1,440	.420
JIYHA	4	41,740	7/.0772	.232	6/64	Binder	5/64	1.06	1,690	.264
JIYJE	2	66,370	7/.0974	.292	6/64	Binder	5/64	1.18	2,040	.166
JIYLO	1	83,690	19/.0664	.332	7/64	Binder	6/64	1.35	2,750	.132
JIYOL	1/0	105,500	19/.0745	.373	7/64	Binder	6/64	1.43	3,030	.105
JIYPF	2/0	133,100	19/.0837	.418	7/64	Binder	6/64	1.52	3,380	.0828
JIYUM	3/0	167,800	19/.0940	.470	7/64	Binder	6/64	1.62	3,800	.0656
JIZAJ	4/0	211,600	19/.1055	.528	7,64	Binder	7/64	1.77	4,730	.0516
JIZEK	...	250,000	37/.0822	.575	8/64	Binder	7/64	1.93	5,350	.0440
JIZIL	...	300,000	37/.0900	.630	8/64	Binder	7/64	2.04	5,930	.0367
JIZJA	...	350,000	37/.0973	.681	8/64	Binder	7/64	2.14	6,470	.0315
JIZKE	...	400,000	37/.1040	.728	8/64	Binder	8/64	2.27	7,580	.0278
JIZYP	...	500,000	37/.1162	.814	8/64	Binder	8/64	2.44	8,650	.0218

RUBBER INSULATED—LEAD SHEATHED CABLE



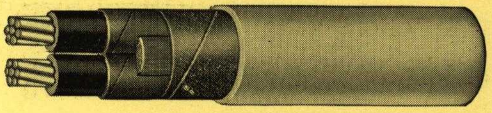
TWO CONDUCTOR—ROUND TYPE "RML-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance/ 1,000′ @ 25°C.
JOAFS	8	16,510	7/.0486	.146	7/64	Binder	5/64	.94	1,360	.667
JOAGT	6	26,250	7/.0612	.184	8/64	Binder	5/64	1.08	1,670	.420
JOAHV	4	41,740	7/.0772	.232	8/64	Binder	5/64	1.18	1,930	.264
JOAKY	2	66,370	7/.0974	.292	8/64	Binder	6/64	1.33	2,610	.166
JOALZ	1	83,690	19/.0664	.332	8/64	Binder	6/64	1.41	2,910	.132
JOAMB	1/0	105,500	19:.0745	.373	8/64	Binder	6/64	1.49	3,180	.105
JOANC	2/0	133,100	19/.0837	.418	8,64	Binder	6/64	1.58	3,540	.0828
JOARG	3/0	167,800	19/.0940	.470	8/64	Binder	6/64	1.69	3,960	.0656
JOASH	4/0	211,600	19/.1055	.528	8/64	Binder	7/64	1.83	4,900	.0516
JOAVK	...	250,000	37/.0822	.575	9/64	Binder	7/64	1.99	5,540	.0440
JOAWL	...	300,000	37/.0900	.630	9/64	Binder	7/64	2.10	6,120	.0367
JOAZN	...	350,000	37/.0973	.681	9/64	Binder	7/64	2.20	6,680	.0315
JOBAP	...	400,000	37/.1040	.728	9/64	Binder	8/64	2.33	7,800	.0276
JOBIR	...	500,000	37/.1162	.814	9/64	Binder	8/64	2.50	8,870	.0218

TWO CONDUCTOR—ROUND TYPE "RML-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance/ 1,000′ @ 25°C.
JOBOS	8	16,510	7/.0486	.146	9/64	Binder	5/64	1.07	1,600	.667
JOBPA	6	26,250	7/.0612	.184	9/64	Binder	5/64	1.15	1,790	.420
JOBSO	4	41,740	7/.0772	.232	9/64	Binder	6/64	1.28	2,370	.264
JOBVY	2	66,370	7/.0974	.292	9/64	Binder	6/64	1.40	2,780	.166
JOBYV	1	83,690	19/.0664	.332	9/64	Binder	6/64	1.48	3,090	.132
JOCER	1/0	105,500	19/.0745	.373	9/64	Binder	6/64	1.56	3,340	.105
JOCRE	2/0	133,100	19/.0837	.418	9,64	Binder	6/64	1.65	3,700	.0828
JOCTO	3/0	167,800	19/.0940	.470	9/64	Binder	7/64	1.78	4,540	.0656
JOCUV	4/0	211,600	19/.1055	.528	9/64	Binder	7/64	1.90	5,080	.0516
JOCWY	...	250,000	37/.0822	.575	10/64	Binder	7/64	2.05	5,720	.0440
JODAR	...	300,000	37/.0900	.630	10/64	Binder	7/64	2.16	6,300	.0367
JODIT	...	350,000	37/.0973	.681	10/64	Binder	8/64	2.30	7,430	.0315
JODOV	...	400,000	37/.1040	.728	10/64	Binder	8/64	2.39	8,010	.0278
JODSE	...	500,000	37/.1162	.814	10/64	Binder	8,64	2.56	9,090	.0218

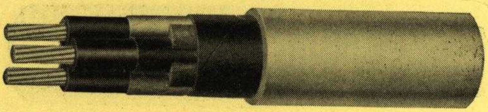
RUBBER INSULATED—LEAD SHEATHED CABLE



TWO CONDUCTOR—ROUND TYPE "RML-50" 5000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance/ 1,000′ @ 25°C.
JODVO	8	16,510	7/.0486	.146	10/64	Binder	5/64	1.13	1,710	.667
JODYX	6	26,250	7/.0612	.184	10/64	Binder	6/64	1.24	2,200	.420
JOEDS	4	41,740	7/.0772	.232	10/64	Binder	6/64	1.34	2,500	.264
JOEJY	2	66,370	7/.0974	.292	10/64	Binder	6/64	1.46	2,900	.166
JOELB	1	83,690	19/.0664	.332	10/64	Binder	6/64	1.54	3,230	.132
JOEND	1/0	105,500	19/.0745	.373	10/64	Binder	6/64	1.62	3,480	.105
JOEPF	2/0	133,100	19/.0837	.418	10/64	Binder	7/64	1.74	4,250	.0828
JOEWM	3/0	167,800	19/.0940	.470	10/64	Binder	7/64	1.84	4,720	.0656
JOFAS	4/0	211,600	19/.1055	.528	10/64	Binder	7/64	1.96	5,260	.0516
JOFET	...	250,000	37/.0822	.575	11/64	Binder	7/64	2.12	5,910	.0440
JOFIV	...	300,000	37/.0900	.630	11/64	Binder	8/64	2.26	7,060	.0367
JOFSA	...	350,000	37/.0973	.681	11/64	Binder	8/64	2.36	7,650	.0315
JOFTE	...	400,000	37/.1040	.728	11/64	Binder	8/64	2.45	8,230	.0278
JOFUX	...	500,000	37/.1162	.814	11/64	Binder	8/64	2.63	9,310	.0218

RUBBER INSULATED—LEAD SHEATHED CABLE



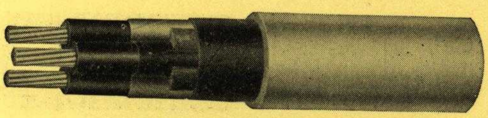
THREE CONDUCTOR—SOLID TYPE "RML" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Diam. Bare Cond., Inches	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000′	Average Resist-ance/ 1,000′ @ 25°C.
KECEC	14	4,107	.064	3/64	Binder	3/64	.52	450	2.63
KECFO	12	6,530	.081	3/64	Binder	4/64	.59	650	1.66
KECHY	10	10,380	.102	3/64	Binder	4,64	.65	755	1.03
KECID	8	16,510	.128	4/64	Binder	4/64	.78	995	0.647

THREE CONDUCTOR—STRANDED TYPE "RML" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing, Each Con-ductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Weight Lbs./ 1,000′	Aver. Resist-ance/ 1,000′ @ 25°C.
JOFWO	14	4,107	7/.0242	.073	3/64	Binder	4/64	.57	605	2.68
JOFZY	12	6,530	7/.0305	.092	3/64	Binder	4/64	.61	680	1.69
JOGAT	10	10,380	7/.0385	.116	3,64	Binder	4/64	.68	790	1.06
JOGEV	8	16,510	7/.0486	.146	4,64	Binder	4/64	.82	1,050	0.667
JOGOY	6	26,250	7/.0612	.184	4/64	Binder	5,64	.89	1,430	.420
JOGTA	4	41,740	7/.0772	.232	4/64	Binder	5/64	.99	1,720	.264
JOGUZ	3	52,640	7/.0867	.260	4/64	Binder	5/64	1.05	1,910	.209
JOGVE	2	66,370	7/.0974	.292	4/64	Binder	5/64	1.21	2,150	.166
JOGYO	1	83,690	19/.0664	.332	5/64	Binder	6/64	1.30	2,900	.132
JOHAV	1/0	105,500	19/.0745	.373	5,64	Binder	6/64	1.39	3,280	.105
JOHCY	2/0	133,100	19/.0837	.418	5/64	Binder	6/64	1.49	3,730	.0828
JOHIX	3/0	167,800	19/.0940	.470	5/64	Binder	6/64	1.60	4,270	.0656
JOHOZ	4/0	211,600	19/.1055	.528	5/64	Binder	6,64	1.73	4,930	.0516
JOHUB	...	250,000	37/.0822	.575	6/64	Binder	7/64	1.93	6,140	.0440
JOHVA	...	300,000	37/.0900	.630	6/64	Binder	7/64	2.05	6,890	.0367
JOHVE	...	350,000	37/.0973	.681	6/64	Binder	7/64	2.15	7,600	.0315
JOHZO	...	400,000	37/.1040	.728	6/64	Binder	7,64	2.29	8,900	.0278
JOICS	...	500,000	37/.1162	.814	6/64	Binder	7/64	2.47	10,280	.0218
JOILC	...	600,000	61/.0992	.893	7/64	Binder	7/64	2.71	11,940	.0184
JOIRJ	...	700,000	61/.1071	.964	7,64	Binder	7/64	2.86	13,300	.0156
JOITL	...	750,000	61/.1109	.998	7/64	Binder	7/64	2.93	13,980	.0146
JOJBO	...	800,000	61/.1145	1.031	7/64	Binder	7/64	3.00	14,630	.0136
JOJIZ	...	900,000	61/.1215	1.093	7/64	Binder	7/64	3.14	15,950	.0121
JOJOB	...	1,000,000	61/.1280	1.152	7/64	Binder	9/64	3.30	18,050	.0109

RUBBER INSULATED—LEAD SHEATHED CABLE



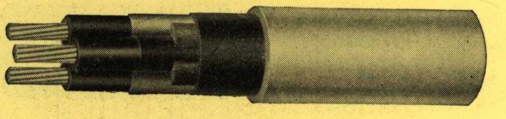
THREE CONDUCTOR TYPE "RML-10" 1000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance/1,000′ @ 25°C.
KECOF	8	16,510	7/.0486	.146	4/64	Binder	4/64	.78	1,000	.667
KECUG	6	26,250	7/.0612	.184	5/64	Binder	5/64	.95	1,520	.420
KECYH	4	41,740	7/.0772	.232	5/64	Binder	5/64	1.06	1,830	.264
KEDAC	2	66,370	7/.0974	.292	5/64	Binder	5/64	1.19	2,280	.166
KEDCA	1	83,690	19/.0664	.332	6/64	Binder	6/64	1.37	3,070	.132
KEDDE	1/0	105,500	19/.0745	.373	6/64	Binder	6/64	1.46	3,440	.105
KEDED	2/0	133,100	19/.0837	.418	6/64	Binder	6/64	1.56	3,900	.0828
KEDGO	3/0	167,800	19/.0940	.470	6/64	Binder	6/64	1.67	4,460	.0656
KEDIF	4/0	211,600	19/.1055	.528	6/64	Binder	7/64	1.83	5,550	.0516
KEDJY	...	250,000	37/.0822	.575	7/64	Binder	7/64	1.99	6,340	.0440
KEDOG	...	300,000	37/.0900	.630	7/64	Binder	7/64	2.11	7,080	.0367
KEDUH	...	350,000	37/.0973	.681	7/64	Binder	7/64	2.22	7,820	.0315
KEDYJ	...	400,000	37/.1040	.728	7/64	Binder	8/64	2.35	9,120	.0278
KEEXY	...	500,000	37/.1162	.814	7/64	Binder	8/64	2.54	10,540	.0218

THREE CONDUCTOR TYPE "RML-20" 2000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance/1,000′ @ 25°C.
KEFAD	8	16,510	7/.0486	.146	5/64	Binder	5/64	.87	1,300	.667
KEFDA	6	26,250	7/.0612	.184	6/64	Binder	5/64	1.02	1,650	.420
KEFEF	4	41,740	7/.0772	.232	6/64	Binder	5/64	1.12	1,970	.264
JOJUC	2	66,370	7/.0974	.292	6/64	Binder	6/64	1.29	2,740	.166
JOJWA	1	83,690	19/.0664	.332	7/64	Binder	6/64	1.44	3,270	.132
JOJYE	1/0	105,500	19/.0745	.373	7/64	Binder	6/64	1.53	3,620	.105
JOKAY	2/0	133,100	19/.0837	.418	7/64	Binder	6/64	1.62	4,070	.0828
JOKCO	3/0	167,800	19/.0940	.470	7/64	Binder	7/64	1.76	5,040	.0656
JOKEZ	4/0	211,600	19/.1055	.528	7/64	Binder	7/64	1.89	5,740	.0516
JOKIB	...	250,000	37/.0822	.575	8/64	Binder	7/64	2.06	6,550	.0440
JOKOC	...	300,000	37/.0900	.630	8/64	Binder	7/64	2.18	7,310	.0367
JOKUD	...	350,000	37/.0973	.681	8/64	Binder	8/64	2.32	8,620	.0315
JOKYA	...	400,000	37/.1040	.728	8/64	Binder	8/64	2.42	9,380	.0278
JOLAZ	...	500,000	37/.1162	.814	8/64	Binder	8/64	2.61	10,800	.0218

RUBBER INSULATED—LEAD SHEATHED CABLE



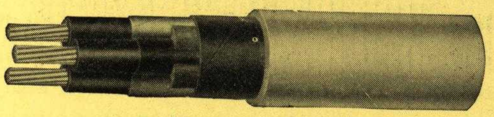
THREE CONDUCTOR TYPE "RML-30" 3,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance/ 1,000′ @ 25°C.
JOLBE	8	16,510	7/.0486	.146	7/64	Binder	5/64	1.00	1,550	.667
JOLDO	6	26,250	7/.0612	.184	8/64	Binder	5/64	1.15	1,920	.420
JOLEB	4	41,740	7/.0772	.232	8/64	Binder	6/64	1.29	2,560	.264
JOLIC	2	66,370	7/.0974	.292	8/64	Binder	6/64	1.42	3,060	.166
JOLOD	1	83,690	19/.0664	.332	8/64	Binder	6/64	1.51	3,450	.132
JOLUF	1/0	105,500	19/.0745	.373	8/64	Binder	6/64	1.59	3,790	.105
JOLYG	2/0	133,100	19/.0837	.418	8/64	Binder	7/64	1.72	4,660	.0828
JOLZA	3/0	167,800	19/.0940	.470	8/64	Binder	7/64	1.83	5,250	.0656
JOMAB	4/0	211,600	19/.1055	.528	8/64	Binder	7/64	1.96	5,950	.0516
JOMBA	...	250,000	37/.0822	.575	9/64	Binder	7/64	2.13	6,790	.0440
JOMCE	...	300,000	37/.0900	.630	9,64	Binder	8/64	2.28	8,100	.0367
JOMEC	...	350,000	37/.0973	.681	9/64	Binder	8/64	2.39	8,870	.0315
JOMFO	...	400,000	37/.1040	.728	9/64	Binder	8/64	2.49	9,630	.0278
JOMID	...	500,000	37/.1162	.814	9/64	Binder	8/64	2.67	11,040	.0218

THREE CONDUCTOR TYPE "RML-40" 4,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance/ 1,000′ @ 25°C.
JOMOF	8	16,510	7/.0486	.146	9/64	Binder	5/64	1.14	1,820	.667
JOMUG	6	26,250	7/.0612	.184	9/64	Binder	6/64	1.26	2,370	.420
JOMYH	4	41,740	7/.0772	.232	9/64	Binder	6,64	1.36	2,730	.264
JONAC	2	66,370	7/.0974	.292	9/64	Binder	6/64	1.49	3,230	.166
JONCA	1	83,690	19/.0664	.332	9,64	Binder	6/64	1.58	3,630	.132
JONDE	1/0	105,500	19/.0745	.373	9/64	Binder	6/64	1.66	3,970	.105
JONED	2/0	133,100	19/.0837	.418	9/64	Binder	7/64	1.79	4,860	.0828
JONGO	3/0	167,800	19/.0940	.470	9/64	Binder	7/64	1.90	5,450	.0656
JONIF	4/0	211,600	19/.1055	.528	9/64	Binder	7,64	2.03	6,170	.0516
JONOG	...	250,000	37/.0822	.575	10/64	Binder	7/64	2.20	6,990	.0440
JONUH	...	300,000	37/.0900	.630	10/64	Binder	8/64	2.34	8,370	.0367
JONYJ	...	350,000	37/.0973	.681	10/64	Binder	8/64	2.45	9,100	.0315
JOOBS	...	400,000	37/.1040	.728	10/64	Binder	8/64	2.55	9,880	.0278
JOOCT	...	500,000	37/.1162	.814	10/64	Binder	8/64	2.74	11,310	.0218

RUBBER INSULATED—LEAD SHEATHED CABLE



THREE CONDUCTOR TYPE "RML-50" 5,000 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding, Each Conductor	Diam. Bare Cond., Ins.	Insulation Thickness, Inches Each Cond.	Insulation Thickness, Inches Belt	Lead Thickness, Ins.	Overall Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance/1,000′ @ 25°C.
JOOGY	8	16,510	7/.0486	.146	10/64	Binder	6/64	1.24	2,260	.667
JOOHZ	6	26,250	7/.0612	.184	10/64	Binder	6/64	1.32	2,520	.420
JOOLD	4	41,740	7/.0772	.232	10/64	Binder	6/64	1.42	2,890	.264
JOONG	2	66,370	7/.0974	.292	10/64	Binder	6/64	1.55	3,400	.166
JOOPH	1	83,690	19/.0664	.332	10/64	Binder	6/64	1.64	3,800	.132
JOORK	1/0	105,500	19/.0745	.373	10/64	Binder	7/64	1.76	4,550	.105
JOOWP	2/0	133,100	19/.0837	.418	10/64	Binder	7/64	1.86	5,050	.0828
JOPAD	3/0	167,800	19/.0940	.470	10/64	Binder	7/64	1.97	5,650	.0656
JOPEF	4/0	211,600	19/.1055	.528	10/64	Binder	7/64	2.09	6,380	.0516
JOPFE	...	250,000	37/.0822	.575	11/64	Binder	8/64	2.29	7,790	.0440
JOPHO	...	300,000	37/.0900	.630	11/64	Binder	8/64	2.41	8,580	.0367
JOPIG	...	350,000	37/.0973	.681	11/64	Binder	8/64	2.52	9,370	.0315
JOPOH	...	400,000	37/.1040	.728	11/64	Binder	8/64	2.63	10,160	.0278
JOPUJ	...	500,000	37/.1162	.814	11/64	Binder	8/64	2.81	11,600	.0218

RUBBER SHEATHED PORTABLE POWER CABLE

Canada Wire & Cable Co. manufactures a complete line of portable cables for supplying power to electric shovels, dredges, compressors, cranes and all movable electrically driven machinery. In addition these cables are highly suitable for making emergency or temporary power connections during repairs or alterations.

Two classes of cables are available, a very high grade product under the copyrighted name of TUFFLEX, and the standard ROUGH USAGE CABLE.

There are three general types of TUFFLEX or ROUGH USAGE cable as follows:

Type W, without ground wires.

Type G, with ground wires.

Type SH, (Shielded) with or without ground wires.

3 CONDUCTOR TYPE W
(Without Ground Wires)

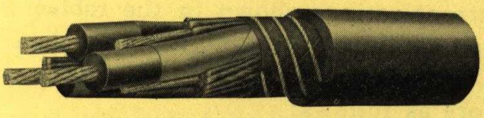
Type SH Cable is further sub-divided into the following:

Type	Ground Wires	Shielding
SH-A	Without	On each Conductor
SH-B	Without	Over Cabled Conductors
SH-C	With	Over Cabled Conductors
SH-D	With	Over each Conductor

Shielding braids over the assembled conductors confine the voltage stress within the core of the cable. When applied over the separate conductors, shielding confines the stress to the individual conductor insulations, eliminating corona and the attendant formation of ozone which is injurious to rubber. Shielding braids, properly grounded, afford protection to the cable and to the operator.

Shielding braids consist of a combination copper-cotton braid with the tinned copper wires running in a direction opposite to the lay of the cable. This combination type braid is preferred since the cotton prevents wear and the resulting breaking of the individual fine copper wires, and improves flexibility.

It is considered good practice to employ ground wires in all shielded high voltage portable cables. These ground wires are uninsulated in SH-D cable to permit electrical contact with the shielding braid.



3 CONDUCTOR TYPE G
(With Ground Wires)

RECOMMENDED VOLTAGES

Type W (without Ground Wires)

This type is not recommended for service above 2,500 volts.

Type G (with Ground Wires)

While cables operating above 2,500 volts should preferably be shielded, the ground wires in Type G cables in effect provide some shielding and afford a certain degree of protection to operators when the wires are grounded at both ends of the cable length.

Type SH (Shielded—with or without Ground Wires)

Type SH shielded cables are similar to Types W and G, as previously described, except for the addition of shielding braids, and are recommended for all operating voltages above 2,500 volts. These cables are classified in four groups, depending upon the way in which the shielding is applied and whether or not ground wires are included.

SELECTION OF TYPE AND SIZE

In selecting the proper type and conductor size, careful consideration should be given to the service conditions under which the cable is to be installed and operated. When there is any question regarding the flexibility, current rating, voltage regulation or shielding, especially where severe service conditions obtain, or where a special design is required, Canada Wire & Cable Co. will be pleased to offer recommendations.

CURRENT RATINGS

The current ratings shown in the tables which follow are based on continuous loading at an ambient temperature of 40°C. Correction factors for various other ambient temperatures are as follows:

Degrees Centigrade	Correction Factor
10	1.58
20	1.41
30	1.22
40	1.00
50	0.71

When a load factor of less than 50% is expected, it may be possible to recommend a smaller conductor or a higher rating for the conductor in use.

When the cable is used with one or more layers wound on a gathering reel, the tabulated current ratings should be corrected by the following factors:

Number of Layers	Percentage of Specified Rating
1	85
2	65
3	45
4	35

TUFFLEX PORTABLE CABLES

General construction features of TUFFLEX, applying particularly to multiple conductor low voltage power types, are described below:

(1) Conductors

Each conductor is composed of fine, tinned, annealed copper wires, specially stranded to insure maximum flexibility. Two classes of stranding are available, depending upon the degree of flexibility desired, as shown on the tabulation which follows.

(2) Insulation

The insulation on individual conductors is a tough special type rubber compound designed for extra ability to stand crushing without electrical or mechanical failure. Insulation thicknesses are in accordance with the Canadian Electrical Code Standards.

(3) Conductor Identification

The insulation on each conductor is protected by a rubber faced tape, colour coded for ready identification. Colours are progressively black, white, red, and green for cables of from one to four conductors.

(4) Fillers

Strong twisted jute fillers are placed in the interstices left by the cabled round conductors. These fillers serve to increase longitudinal strength, and provide protection against crushing, beside maintaining a round cable.

(5) Ground Wires

Ground wires can be included with the fillers when required for electrical purposes. Cable without ground wires is designated as Type W, and cable with ground wires as Type G.

(6) Overall Covering

The cabled conductors and fillers are covered with a helically applied rubber faced tape, over which is applied an open reinforcing serving of seine twine cord. This is an important factor in resisting crushing.

Over all is placed a tough, resilient, abrasion-resisting jacket of 60% rubber. This stock is the equivalent of the best automobile tire treads.

ROUGH USAGE CABLE

Where a cable is required for somewhat less important or severe service than those listed under TUFFLEX, ROUGH USAGE cable is available. This cable is made up in substantially the same manner as TUFFLEX, with the exception that a 30% rubber compound is used for the conductor insulation, and a 40% rubber compound for the overall jacket. On this type of cable also, the rubber faced binder tape binding the cabled conductors together and the reinforcing serving of seine twine are omitted.

SPECIAL OVERALL COVERINGS

When unusual service conditions are encountered, such as exposure to oil or a flame-resisting cable is imperative, the use of NEOPRENE is recommended as a jacketting material.

For applications in which the cable does not require as great a degree of mechanical protection various grades of weatherproof braid coverings are available.

TUFFLEX RUBBER SHEATHED PORTABLE POWER CABLE

THREE CONDUCTOR **TYPES "W" and "G"** **600 VOLTS**

Conductor Size B. & S.	Conductor Strand-ing	Conductor Diam., Inches	Insula-tion Thick-ness, Inches	Type W Over-all Diam., Inches	Type W Net Weight Pounds per 1,000′	Type G Ground Wires	Type G Net Weight Pounds per 1,000′	*Current Carry-ing Capa-city, Amps.
8	49/No. 25	.161	4/64	.89	465	3 x 19/No. 27	505	35
8	133/No. 29	.169	4/64	.89	470	3 x 19/No. 27	515	35
6	49/No. 23	.203	4/64	1.00	615	3 x 19/No. 25	670	50
6	133/No. 27	.213	4/64	1.00	630	3 x 19/No. 25	685	50
4	49/No. 21	.256	4/64	1.14	850	3 x 19/No. 23	935	65
4	133/No. 25	.268	4/64	1.14	870	3 x 49/No. 27	955	65
3	49/No. 20	.288	4/64	1.22	1,010	3 x 49/No. 26	1,120	75
3	133/No. 24	.302	4/64	1.22	1,030	3 x 49/No. 26	1,140	75
2	133/No. 23	.339	4/64	1.36	1,280	3 x 49/No. 25	1,420	90
2	259/No. 26	.335	4/64	1.36	1,270	3 x 49/No. 25	1,440	90
1	133/No. 22	.380	5/64	1.54	1,640	3 x 49/No. 24	1,810	100
1	259/No. 25	.376	5/64	1.54	1,610	3 x 49/No. 24	1,790	100
1/0	133/No. 21	.427	5/64	1.66	1,960	3 x 49/No. 23	2,180	120
1/0	259/No. 24	.422	5/64	1.66	1,930	3 x 49/No. 23	2,150	120
2/0	133/No. 20	.479	5/64	1.79	2,340	3 x 133/No. 26	2,640	135
2/0	259/No. 23	.474	5/64	1.79	2,320	3 x 133/No. 26	2,620	135
3/0	259/No. 22	.532	5/64	1.93	2,780	3 x 133/No. 25	3,160	155
3/0	427/No. 24	.543	5/64	1.93	2,820	3 x 133/No. 25	3,190	155
4/0	259/No. 21	.598	5/64	2.10	3,380	3 x 133/No. 24	3,850	180
4/0	427/No. 23	.610	5/64	2.10	3,440	3 x 133/No. 24	3,910	180

* Refer to information under "Current Ratings" on page 184 before using these current carrying capacities.

TUFFLEX RUBBER SHEATHED PORTABLE POWER CABLE

TWO CONDUCTOR **TYPE "W"** **600 VOLTS**

Conductor Size B. & S.	Conductor Stranding	Diam., Inches	Insulation Thickness, Inches	Overall Diam., Inches	Net Weight Pounds/ 1,000'	*Current Carrying Capacity, Amps.
8	49/No. 25	.161	4/64	.84	365	40
8	133/No. 29	.169	4/64	.84	370	40
6	49/No. 23	.203	4/64	.94	480	50
6	133/No. 27	.213	4/64	.94	490	50
4	49/No. 21	.256	4/64	1.07	660	70
4	133/No. 25	.268	4/64	1.07	670	70
3	49/No. 20	.288	4/64	1.14	770	80
3	133/No. 24	.302	4/64	1.14	780	80
2	133/No. 23	.339	4/64	1.26	965	95
2	259/No. 26	.335	4/64	1.26	955	95
1	133/No. 22	.380	5/64	1.43	1,230	110
1	259/No. 25	.376	5/64	1.43	1,220	110
1/0	133/No. 21	.427	5/64	1.55	1,480	130
1/0	259/No. 24	.422	5/64	1.55	1,470	130
2/0	133/No. 20	.479	5/64	1.67	1,760	150
2/0	259/No. 23	.474	5/64	1.67	1,750	150
3/0	259/No. 22	.532	5/64	1.80	2,080	175
3/0	427/No. 24	.543	5/64	1.80	2,110	175
4/0	259/No. 21	.598	5/64	1.96	2,530	200
4/0	427/No. 23	.610	5/64	1.96	2,560	200

* Refer to information under "Current Ratings" on page 184 before using these current carrying capacities.

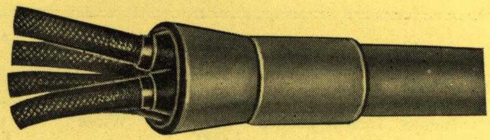
TUFFLEX RUBBER SHEATHED PORTABLE POWER CABLE

FOUR CONDUCTOR **TYPES "W" and "G"** **600 VOLTS**

Size B. & S.	Conductor Stranding	Conductor Diam., Inches	Insulation Thickness, Inches	Type W Over-all Diam., Inches	Type W Net Weight Pounds per 1,000′	Type G Ground Wires	Type G Net Weight Pounds per 1,000′	*Current Carrying Capacity, Amps.
8	49/No. 25	.161	4/64	1.01	610	3 x 19/No. 28	640	30
8	133/No. 29	.169	4/64	1.01	615	3 x 19/No. 28	645	30
6	49/No. 23	.203	4/64	1.12	790	3 x 19/No. 26	835	40
6	133/No. 27	.213	4/64	1.12	805	3 x 19/No. 26	850	40
4	49/No. 21	.256	4/64	1.27	1,090	3 x 19/No. 24	1,160	55
4	133/No. 25	.268	4/64	1.27	1,120	3 x 19/No. 24	1,190	55
3	49/No. 20	.285	4/64	1.36	1,290	3 x 49/No. 27	1,380	65
3	133/No. 24	.302	4/64	1.36	1,320	3 x 49/No. 27	1,410	65
2	133/No. 23	.339	4/64	1.51	1,640	3 x 49/No. 26	1,750	75
2	259/No. 26	.335	4/64	1.51	1,620	3 x 49/No. 26	1,740	75
1	133/No. 22	.380	5/64	1.72	2,100	3 x 49/No. 25	2,240	85
1	259/No. 25	.376	5/64	1.72	2,080	3 x 49/No. 25	2,220	85
1/0	133/No. 21	.427	5/64	1.85	2,520	3 x 49/No. 24	2,690	100
1/0	259/No. 24	.422	5/64	1.85	2,490	3 x 49/No. 24	2,660	100
2/0	133/No. 20	.499	5/64	2.00	3,030	3 x 133/No. 27	3,270	115
2/0	259/No. 23	.474	5/64	2.00	2,990	3 x 133/No. 27	3,230	115
3/0	259/No. 23	.532	5/64	2.16	3,600	3 x 133/No. 26	3,900	130
3/0	427/No. 24	.543	5/64	2.16	3,660	3 x 133/No. 26	3,960	130
4/0	259/No. 21	.598	5/64	2.35	4,380	3 x 133/No. 25	4,760	150
4/0	427/No. 23	.610	5/64	2.35	4,460	3 x 133/No. 25	4,840	150

* Refer to information under "Current Ratings" on page 184 before using these current carrying capacities.

MOULDED TERMINALS
for
RUBBER SHEATHED PORTABLE POWER CABLES



Many important users of rubber sheathed portable power cable, particularly in the larger sizes, specify that the cable be equipped with a moulded rubber terminal or cap at each end of the cable before shipment. These provide an efficient seal against the entrance of moisture into the cable. Before applying the terminal, the individual conductors are each covered with a weatherproof braid as far as the end of the rubber jacket. Where ground wires are included in the cable, these are brought together and soldered to a single, rubber insulated weatherproof braided conductor. Shielding tapes, where used, are also soldered to this conductor with the ground wires, this common connection being made at a point "inside" the moulded terminal. Individual conductors, external to the terminal are 24 inches in length unless otherwise specified by the customer.

The moulded terminal is made from the same type of rubber as is used in the sheath of the cable itself, carefully applied and vulcanized to ensure a perfect seal.

CONTROL CABLES

Control cables have a wide application in generating stations and sub-stations, industrial plants, and for general purposes where a multiple conductor cable is desired for remote control operation of motors, circuit breakers and other power equipment; for relay and metering circuits; for traffic light systems; and other automatic of supervisory indicating circuits of varied nature.

These cables are usually constructed in accordance with the Canadian Engineering Standards Association Specifi-

cation C21-1927 which, however, permits a wide variation as to choice of details depending upon the service conditions.

The following is a brief description of this type of cable.

CONDUCTORS

Conductors are tinned soft or annealed copper, the size depending on the permissible load and voltage drop. Sizes for ordinary applications range from No. 14 B & S to No. 9 B & S, but larger conductors up to No. 2 B & S are sometimes used. Stranded conductors are generally used although solid conductors are permissible.

INSULATION

Each conductor is insulated for 600 volts working pressure with either Code grade rubber, or any of the special grade compounds described on Page 157 depending upon service conditions.

BRAIDS

Identification of circuits in Control cables is obtained by means of a coloured cotton braid on each conductor, the available colours being as follows:

1. White
2. Black
3. Red
4. Green
5. Yellow
6. White—Black
7. White—Red
8. White—Green
9. White—Yellow
10. Black—Red
11. Black—Green
12. Black—Yellow
13. Red—Green
14. Red—Yellow
15. Green—Yellow

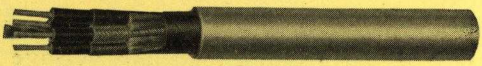
Colours are used in the order shown, commencing with the largest conductor. Conductor braids are given a clear wax moisture-resistant finish.

OVERALL COVERING

The cabled conductors are given an overall covering consisting of either a braid, rubber jacket, or a lead sheath depending upon service conditions.

The following tabulation gives dimensions and other data of a representative range of sizes of Control Cable:

CONTROL CABLE
RUBBER INSULATED—BRAID OR LEAD COVERED



600 VOLTS

Cond. Size, B. & S.	No. of Conds.	Stranding, Each Conductor	Diam. Each Cond., Inches	Insulation Thickness, Inches	Braided Cable: Overall Diam., Inches	Braided Cable: Net Weight Pounds/1,000′	Lead Sheathed Cable: Lead Thickness, Inches	Lead Sheathed Cable: Overall Diam., Inches	Lead Sheathed Cable: Net Weight Pounds/1,000′
14	1	7 x No. 22	.076	3/64	.20	30	3/64	.30	230
14	2	7 x No. 22	.076	3/64	.44 x .24	75	3/64	.49 x .29	350
14	3	7 x No. 22	.076	3/64	.50	130	4/64	.60	650
14	4	7 x No. 22	.076	3/64	.55	170	4/64	.65	740
14	5	7 x No. 22	.076	3/64	.62	205	4/64	.71	840
14	6	7 x No. 22	.076	3/64	.68	245	4/64	.77	930
14	7	7 x No. 22	.076	3/64	.68	265	4/64	.77	950
14	8	7 x No. 22	.076	3/64	.73	305	4/64	.82	1,050
14	9	7 x No. 22	.076	3/64	.83	360	5/64	.96	1,430
14	10	7 x No. 22	.076	3/64	.88	390	5/64	1.00	1,520
14	12	7 x No. 22	.076	3/64	.91	440	5/64	1.04	1,610
12	1	19 x No. 25	.090	3/64	.21	40	3/64	0.32	260
12	2	19 x No. 25	.090	3/64	.47 x .25	90	3/64	.53 x .31	395
12	3	19 x No. 25	.090	3/64	.53	170	4/64	.63	715
12	4	19 x No. 25	.090	3/64	.59	205	4/64	.68	815
12	5	19 x No. 25	.090	3/64	.66	250	4/64	.75	910
12	6	19 x No. 25	.090	3/64	.72	285	4/64	.81	1,020
12	7	19 x No. 25	.090	3/64	.72	315	4/64	.81	1,050
12	8	19 x No. 25	.090	3/64	.78	370	5/64	.90	1,370
12	9	19 x No. 25	.090	3/64	.88	435	5/64	1.01	1,550
12	10	19 x No. 25	.090	3/64	.93	445	5/64	1.06	1,640
12	12	19 x No. 25	.090	3/64	.97	510	5/64	1.09	1,760
9	1	19 x No. 22	.127	3/64	.24	65	3/64	0.35	295
9	2	19 x No. 22	.127	3/64	.58	165	4/64	.68	780
9	3	19 x No. 22	.127	3/64	.63	270	4/64	.72	885
9	4	19 x No. 22	.127	3/64	.70	320	4/64	.79	1,030
9	5	19 x No. 22	.127	3/64	.77	390	5/64	.89	1,390
9	6	19 x No. 22	.127	3/64	.85	455	5/64	.98	1,550
9	7	19 x No. 22	.127	3/64	.85	500	5/64	.98	1,600
9	8	19 x No. 22	.127	3/64	.92	570	5/64	1.04	1,750
9	9	19 x No. 22	.127	3/64	1.04	665	5/64	1.17	2,000
9	10	19 x No. 22	.127	3/64	1.11	700	6/64	1.24	2,450
9	12	19 x No. 22	.127	3/64	1.15	825	6/64	1.31	2,650

ASBESTOS-VARNISHED CAMBRIC
INSULATED POWER CABLES

All-asbestos, and asbestos-varnished cambric wires and cables fulfil the need for an insulated conductor suitable for operation under high temperature and flame conditions, beyond that which any other standard conductor insulation can withstand.

In most cable constructions, one or more layers of asbestos are applied alternately with one or more layers of helically applied varnished cambric tape, the latter providing a flexible insulation of high dielectric strength to reinforce the electrical characteristics of the asbestos. The layers of asbestos are saturated with flame-retarding, heat-resisting and, usually, moisture-resisting compounds.

Construction details of the various types of this class of wire and cable, together with the class of service for which each type is approved are given in Table 1.

Data given in the succeeding Tables are for the most commonly used types of braid covered, or lead covered cables for industrial plants at working voltages up to 600 volts. Lead sheathed cables may be armoured if desired.

All details are in accordance with the Canadian Engineering Standards Association Specification C 22.2, No. 28 (1st Draft, Sept., 1939).

CONSTRUCTION DETAILS, ETC., AND THE USES OF THE VARIOUS TYPES OF ASBESTOS INSULATED CONDUCTORS

Type Designation	Size of Cond'r., MCM. or B. & S. G.	Kind of Conductor	Kind of Insulation	Kind of Outer Covering	Treatment of Asbestos Insulation	Treatment of Outer Braid	Voltage Rating	General and Special Applications
Type A-1	14 B. & S. Gauge to 1,000 MCM.	Solid or Stranded up to 4/0 B. & S. G.; Stranded only above 4/0 B. & S. G.	Varnished-Cambric and Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	600-V.	ASBESTOS-VARNISHED-CAMBRIC POWER WIRE AND CABLE For general power wiring, either open or in conduit; for use in power plants, industrial plants, boiler rooms and similar places; for use where conductors will be exposed to heat, grease and corrosive fumes, but where no great amount of moisture is present.
Type A-2	14 B. & S. Gauge to 1,000 MCM.	Stranded only	Varnished-Cambric and Asbestos	Lead Sheath	Flame-retarding, heat- and moisture-resisting		600-V.	LEAD-SHEATHED ASBESTOS-VARNISHED-CAMBRIC POWER CABLE Same use as for Type A-1, but where, in addition, the insulation may be subjected to moisture of condensation; or where the cable is to be submerged in water.
Type A-3	14 B. & S. Gauge to 1,000 MCM.	Stranded only	Varnished-Cambric and Asbestos	Cotton Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding and heat-resisting	600-V.	SWITCHBOARD BUS CABLE For the wiring of switchboards and other types of control apparatus.
Type A-4	14 to 4/0 B. & S. Gauge	Solid or Stranded (Tinned)	Varnished-Cambric and Asbestos	Cotton Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding and heat-resisting	600-V.	SWITCHBOARD WIRE AND CABLE Same use as for Type A-3 but where tinned, solid or stranded conductors are desired.
Type A-5	14 to 8 B. & S. Gauge	Flexible-Stranding only (Tinned)	Varnished-Cambric and Asbestos	Cotton Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding and heat-resisting	600-V.	HINGE CABLE For swinging-panel connections; and for general switchboard and panel wiring where a degree of flexibility is required.
Type A-6	9 and 12 B. & S. Gauge	Flexible-Stranded Conductors (Tinned)	Varnished-Cambric and Asbestos	Cotton braid on each individual conductor and a protective tape followed by an asbestos braid over the assembly of cond's.	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting (Does not apply to the protective tape.)	600-V.	MULTI-CONDUCTOR CONTROL CABLE For control or signal wiring, either open or in conduit; for use in power stations, boiler rooms or other locations where a multi-conductor cable is required to withstand operating temperatures too high for other general types of insulation.

CONSTRUCTION DETAILS, ETC., AND THE USES OF THE VARIOUS TYPES OF ASBESTOS INSULATED CONDUCTORS

Type Designation	Size of Cond'r., MCM. or B. & S. G.	Kind of Conductor	Kind of Insulation	Kind of Outer Covering	Treatment of Asbestos Insulation	Treatment of Outer Braid	Voltage Rating	General and Special Applications
Type A-7	14 B. & S. Gauge to 1,000 MCM.	Solid or Stranded up to 4/0 B. & S. G.; Stranded only above 4/0 B. & S. G. (Tinned or Untinned)	Asbestos	Asbestos Braid	Flame-retarding and heat-resisting	Flame-retarding and heat-resisting	600-V.	ALL-ASBESTOS POWER WIRE AND CABLE For open wiring, and the wiring of switchboards, control panels; for wiring in the vicinity of furnaces, bake-ovens, hotel and restaurant cooking ranges and similar locations where a heat-resisting and flame-retarding insulation is desirable and where the wiring is exposed to heat, grease and corrosive fumes.
Type A-8	16 to 10 B. & S. Gauge	Flexible-Stranding only (Tinned)	Varnished-Cambric and Asbestos	Cotton Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	600-V.	HEAD-LIGHT CABLE For use as cab and instrument-light wiring on steam locomotives, and similar uses where heat and grease are present, but no great amount of moisture.
Type A-9	14 B. & S. Gauge to 1,000 MCM.	Flexible-Stranding only (Tinned)	Varnished-Cambric and Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture resisting	600-V.	ASBESTOS-VARNISHED-CAMBRIC APPARATUS CABLE For flexible leads of motors and transformers, coil connections and for the internal wiring of machinery in mines, in power-plants, steel-mills, foundries, boiler-rooms and on cranes; or for open wiring or in conduit; where wiring is exposed to heat, grease, and corrosive fumes, but where no great amount of moisture is present.
Type A-10	14 B. & S. Gauge to 500 MCM.	Flexible-Stranding only (Tinned)	Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	600-V.	ALL-ASBESTOS APPARATUS CABLE For use where flexible leads must be operated under high-temperature conditions such as leads on electric furnaces.
Type A-11	14 to 4/0 B. & S. Gauge	Extra-Flexible Stranding only	Asbestos	Asbestos Braid	Flame-retarding and heat-resisting	Flame-retarding and heat-resisting	300-V.	ALL-ASBESTOS EXTRA-FLEXIBLE CABLE For motion-picture projectors, arc-lamps, spot-lights, stage-lights, search-lights, electric cranes and controllers, etc., where extreme flexibility of the conductor is required and where the insulation is subjected to high temperatures.

CONSTRUCTION DETAILS, ETC., AND THE USES OF THE VARIOUS TYPES OF ASBESTOS INSULATED CONDUCTORS

Type Desig-nation	Size of Cond'r., MCM. or B. & S. G.	Kind of Conductor	Kind of Insulation	Kind of Outer Covering	Treatment of Asbestos Insulation	Treatment of Outer Braid	Voltage Rating	General and Special Applications
Type A-12	18 to 10 B. & S. Gauge	Flexible-Stranding only	Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	300-V.	ALL-ASBESTOS TWO-CONDUCTOR CORD For use as cab and instrument-light wiring on steam locomotives, and as extension cord in steel-mills, kiln-rooms and similar hot locations.
Type A-13	18 to 10 B. & S. Gauge	Flexible-Stranding only	Varnished-Cambric and Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	300-V.	ASBESTOS-VARNISHED-CAMBRIC TWO-CONDUCTOR CORD Same use as for Type A-12, but where, in addition, the insulation may be exposed to grease, but where no great amount of moisture is present.
Type A-14	18 to 10 B. & S. Gauge	Flexible-Stranding only (Tinned)	Varnished-Cambric and Asbestos	Asbestos Braid	Flame-retarding, heat- and moisture-resisting	Flame-retarding, heat- and moisture-resisting	600-V.	ASBESTOS-VARNISHED-CAMBRIC TWO-CONDUCTOR CORD Same use as for Type A-13 but at a higher voltage.
Types A-15 (copper) A-15N (nickel)	18 to 4 B. & S. Gauge	Solid or Stranded (Copper or Nickel)	Varnished-Cambric and Asbestos	Asbestos Braid	Flame-retarding and heat-resisting or flame-retarding, heat and moisture-resisting	Flame-retarding and heat-resisting	300-V.	STOVE WIRE AND CABLE For the wiring of electric stoves, ranges and similar electrical appliances.
Types A-16 (copper) A-16N (nickel)	18 to 8 B. & S. Gauge	Solid or Stranded (Copper or Nickel)	Plain Asbestos	None	Flame-retarding and heat-resisting or flame-retarding, heat- and moisture-resisting		300-V.	APPLIANCE LEAD-WIRE AND CABLE For the wiring of sandwich toasters, grills and waffle-irons.
Type A-17	18 to 8 B. & S. Gauge	Solid or Stranded	Varnished-Cambric and Asbestos	None	Flame-retarding heat- and moisture-resisting		300-V.	STOVE WIRE AND CABLE For the wiring of electric stoves, ranges and similar electrical appliances where the temperature to which the conductor is subjected will not exceed 100 deg. C. (212 deg. F.), excluding the part one inch from the element terminals.

Asbestos - Varnished Cambric
INSULATED BRAID COVERED CABLE

SINGLE CONDUCTOR
SOLID and STRANDED **TYPE "A-1"** **600 VOLTS**

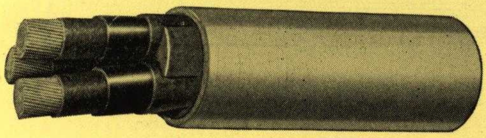
Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Inches 1st Asb.	Insulation Thickness, Inches V.C.	Insulation Thickness, Inches 2nd Asb.	Braid Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
OFABD	14	4,107	Solid	.064	....	.025	.020	.045	.245	30	2.575
OFACF	14	4,107	7/.0242	.073	....	.025	.020	.045	.255	35	2.627
OFAHK	12	6,530	Solid	.081	....	.025	.020	.045	.265	40	1.619
OFAJL	12	6,530	7/.0305	.092	....	.025	.020	.045	.275	50	1.652
OFALN	10	10,380	Solid	.102	....	.025	.020	.045	.285	55	1.018
OFAMP	10	10,380	7/.0385	.116	....	.025	.020	.045	.300	70	1.039
OFAVY	8	16,510	Solid	.128	....	.025	.020	.045	.310	80	0.641
OFAWZ	8	16,510	7/.0486	.146	....	.025	.020	.045	.325	95	.654
OFBAD	6	26,250	Solid	.162	.015	.030	.020	.045	.385	140	.403
OFBIG	6	26,250	7/.0612	.184	.015	.030	.020	.045	.405	145	.410
OFBUJ	5	33,100	Solid	.182	.015	.030	.020	.045	.400	160	.320
OFBYK	5	33,100	7/.0688	.206	.015	.030	.020	.045	.430	170	.326
OFCOJ	4	41,740	Solid	.204	.015	.030	.020	.045	.425	195	.253
OFCYL	4	41,740	7/.0772	.232	.015	.030	.020	.045	.455	200	.259
OFDIJ	3	52,640	Solid	.229	.015	.030	.020	.045	.450	235	.201
OFDYM	3	52,640	7/.0867	.260	.015	.030	.020	.045	.480	240	.205
OFEJM	2	66,370	Solid	.258	.015	.030	.020	.045	.480	280	.159
OFELP	2	66,370	7/.0974	.292	.015	.030	.020	.045	.515	290	.162
OFEPS	1	83,690	Solid	.289	.015	.030	.030	.045	.530	350	.126
OFERV	1	83,690	19/.0664	.332	.015	.030	.030	.045	.575	375	.129
OFETY	1/0	105,500	Solid	.325	.015	.030	.030	.045	.565	425	.100
OFEVZ	1/0	105,500	19/.0745	.373	.015	.030	.030	.045	.615	480	.102
OFEWB	2/0	133,100	Solid	.365	.015	.030	.030	.045	.610	545	.0795
OFEZD	2/0	133,100	19/.0837	.418	.015	.030	.030	.045	.660	575	.0811
OFFAH	3/0	167,800	Solid	.410	.015	.030	.030	.045	.650	660	.0630
OFFGO	3/0	167,800	19/.0940	.470	.015	.030	.030	.045	.710	690	.0642
OFFHE	4/0	211,600	Solid	.460	.015	.030	.030	.045	.700	800	.0500
OFFJA	4/0	211,600	19/.1055	.528	.015	.030	.030	.045	.770	840	.0509
OFFYN	...	250,000	37/.0822	.575	.030	.040	.040	.045	.885	1,020	.0431
OFGAJ	...	300,000	37/.0900	.630	.030	.040	.040	.045	.940	1,190	.0360
OFGUN	...	350,000	37/.0973	.681	.030	.040	.040	.045	.995	1,360	.0308
OFGYP	...	400,000	37/.1040	.728	.030	.040	.040	.045	1.040	1,530	.0270
OFHIM	...	450,000	37/.1103	.772	.030	.040	.040	.045	1.085	1,700	.0240
OFICH	...	500,000	37/.1162	.814	.030	.040	.040	.045	1.125	1,860	.0216
OFIFK	...	550,000	61/.0950	.855	.030	.040	.040	.045	1.165	2,030	.0196
OFIJN	...	600,000	61/.0992	.893	.030	.040	.040	.045	1.205	2,200	.0180
OFIPT	...	650,000	61/.1032	.929	.030	.040	.040	.045	1.240	2,360	.0166
OFITZ	...	700,000	61/.1071	.964	.030	.040	.040	.045	1.275	2,530	.0154
OFIXD	...	750,000	61/.1109	.998	.030	.040	.040	.045	1.310	2,690	.0144
OFJYR	...	800,000	61/.1145	1.031	.030	.040	.040	.045	1.345	2,860	.0135
OFKLO	...	900,000	61/.1215	1.093	.030	.040	.040	.045	1.405	3,190	.0120
OFKNA	...	1,000,000	61/.1280	1.152	.030	.040	.040	.045	1.465	3,510	.0108

Asbestos-Varnished Cambric
INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR **TYPE "A-2"** **600 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Inches 1st Asb.	V.C.	2nd Asb.	Lead Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./1 000′	Aver. Resistance Ohms/1,000′ @ 25°C.
OFLOR	14	4,107	7/.0242	.073	.015	.030	.030	2/64	.290	170	2.627
OFLUS	12	6,530	7/.0305	.092	.015	.030	.030	2/64	.305	195	1.652
OFLYT	10	10,380	7/.0385	.116	.015	.030	.030	3/64	.360	275	1.039
OFMAP	8	16,510	7/.0486	.146	.015	.030	.030	3/64	.390	335	0.654
OFMIR	6	26,250	7/.0612	.184	.015	.030	.030	4/64	.460	490	.410
OFMOS	5	33,100	7/.0688	.206	.015	.030	.030	4/64	.485	540	.326
OFMUT	4	41,740	7/.0772	.232	.015	.030	.030	4/64	.510	590	.259
OFMYV	3	52,640	7/.0867	.260	.015	.030	.030	4/64	.535	660	.205
OFNER	2	66,370	7/.0974	.292	.015	.030	.030	4/64	.570	715	.162
OFNIS	1	83,690	19/.0664	.332	.020	.030	.030	4/64	.620	890	.129
OFNOT	1/0	105,500	19/.0745	.373	.020	.030	.030	4/64	.660	1,005	.102
OFNUV	2/0	133,100	19/.0837	.418	.020	.030	.030	4/64	.705	1,150	.0811
OFOGM	3/0	167,800	19/.0940	.470	.020	.030	.030	4/64	.755	1,320	.0642
OFOHN	4/0	211,600	19/.1055	.528	.020	.030	.030	4/64	.815	1,520	.0509
OFOJP	...	250,000	37/.0822	.575	.030	.040	.040	5/64	.955	2,040	.0431
OFONT	...	300,000	37/.0900	.630	.030	.040	.040	5/64	1.010	2,270	.0360
OFORY	...	350,000	37/.0973	.681	.030	.040	.040	5/64	1.060	2,500	.0308
OFOSZ	...	400,000	37/.1040	.728	.030	.040	.040	5/64	1.105	2,730	.0270
OFOWD	...	500,000	37/.1162	.814	.030	.040	.040	5/64	1.190	3,170	.0216
OFPAR	...	600,000	61/.0992	.893	.030	.040	.040	6/64	1.305	3,930	.0180
OFPES	...	750,000	61/.1109	.998	.030	.040	.040	6/64	1.410	4,570	.0144
OFPIT	...	800,000	61/.1145	1.031	.030	.040	.040	6/64	1.440	4,790	.0135
OFPOV	...	900,000	61/.1215	1.093	.030	.040	.040	6/64	1.505	5,210	.0120
OFPRE	...	1,000,000	61/.1280	1.152	.030	.040	.040	6/64	1.560	5,620	.0108

Asbestos - Varnished Cambric
INSULATED LEAD SHEATHED CABLE



THREE CONDUCTOR **TYPE "A-2" (M)** **600 VOLTS**

Code	Conductor Size B. & S.	Conductor Size C.M.	Strand-ing, Each Cond.	Diam. Bare Cond., Ins.	Insulation Thickness, Inches 1st Asb.	V.C.	2nd Asb.	Lead Thick-ness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./ 1,000′	Aver. Resist-ance Ohms/ 1,000′ @ 25°C.
OFRAT	14	4,107	7/.0242	.073	.015	.030	.030	4/64	.621	625	2.627
OFROY	12	6,530	7/.0305	.092	.015	.030	.030	4/64	.662	690	1.652
OFRUZ	10	10,380	7/.0385	.116	.015	.030	.030	4/64	.715	790	1.039
OFSAV	8	16,510	7/.0486	.146	.015	.030	.030	4/64	.780	915	0.654
OFSIX	6	26,250	7/.0612	.184	.015	.030	.030	5/64	.890	1,310	.410
OFSOZ	5	33,100	7/.0688	.206	.015	.030	.030	5/64	.940	1,440	.326
OFSTO	4	41,740	7/.0772	.232	.015	.030	.030	5/64	.995	1,600	.259
OFSUB	3	52,640	7/.0867	.260	.015	.030	.030	5/64	1.05	1,780	.205
OFSVE	2	66,370	7/.0974	.292	.015	.030	.030	5/64	1.12	2,010	.162
OFSWA	1	83,690	19/.0664	.332	.020	.030	.030	6/64	1.26	2,620	.129
OFSTIZ	1/0	105,500	19/.0745	.373	.020	.030	.030	6/64	1.35	2,970	.102
OFSOB	2/0	133,100	19/.0837	.418	.020	.030	.030	6/64	1.45	3,390	.0811
OFSUC	3/0	167,800	19/.0940	.470	.020	.030	.030	6/64	1.56	3,890	.0642
OFSVO	4/0	211,600	19/.1055	.528	.020	.030	.030	7/64	1.72	4,930	.0509
OFSWE	...	250,000	37/.0822	.575	.030	.040	.040	7/64	1.95	5,780	.0431
OFUGN	...	300,000	37/.0900	.630	.030	.040	.040	7/64	2.06	6,470	.0360
OFULS	...	350,000	37/.0973	.681	.030	.040	.040	7/64	2.17	7,150	.0308
OFUMT	...	400,000	37/.1040	.728	.030	.040	.040	8/64	2.30	8,490	.0270
OFURZ	...	500,000	37/.1162	.814	.030	.040	.040	8/64	2.49	9,710	.0216
OFUSB	...	600,000	61/.0992	.893	.030	.040	.040	8/64	2.66	11,020	.0180
OFUVD	...	750,000	61/.1109	.998	.030	.040	.040	8/64	2.89	12,950	.0144
OFVAY	...	800,000	61/.1145	1.031	.030	.040	.040	8/64	2.96	13,560	.0135
OFVEZ	...	900,000	61/.1215	1.093	.030	.040	.040	8/64	3.09	14,780	.0120
OFVIB	...	1,000,000	61/.1280	1.152	.030	.040	.040	8/64	3.22	16,010	.0108

ALL-ASBESTOS
INSULATED BRAID COVERED CABLE

SINGLE CONDUCTOR SOLID and STRANDED — TYPE "A-7" — 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Ins. Asbestos	Braid Thickness, Ins.	Overall Diam., Ins.	Net Weight Pounds/ 1,000′	Aver. Resistance Ohms/ 1,000′ @ 25°C.
OGCYG	14	4,107	Solid	.064	.040	.045	.235	36	2.575
OGDAB	14	4,107	7/.0242	.073	.040	.045	.245	38	2.627
OGDDO	12	6,530	Solid	.081	.040	.045	.255	46	1.619
OGDEC	12	6,530	7/.0305	.092	.040	.045	.265	48	1.652
OGDFE	10	10,380	Solid	.102	.040	.045	.275	60	1.018
OGDID	10	10,380	7/.0385	.116	.040	.045	.290	63	1.039
OGDOF	8	16,510	Solid	.128	.040	.045	.300	85	0.641
OGDUG	8	16,510	7/.0486	.146	.040	.045	.320	88	.654
OGDYH	6	26,250	Solid	.162	.060	.045	.375	120	.403
OGEBZ	6	26,250	7/.0612	.184	.060	.045	.395	135	.410
OGEFD	5	33,100	Solid	.182	.060	.045	.390	145	.320
OGELK	5	33,100	7/.0688	.206	.060	.045	.420	160	.326
OGETS	4	41,740	Solid	.204	.060	.045	.415	170	.253
OGEVT	4	41,740	7/.0772	.232	.060	.045	.445	190	.259
OGEZY	3	52,640	Solid	.229	.060	.045	.440	208	.201
OGFAC	3	52,640	7/.0867	.260	.060	.045	.470	228	.205
OGFED	2	66,370	Solid	.258	.060	.045	.470	255	.159
OGFIF	2	66,370	7/.0974	.292	.060	.045	.505	275	.162
OGFOG	1	83,690	Solid	.289	.090	.045	.560	330	.126
OGFUH	1	83,690	19/.0664	.332	.090	.045	.605	390	.129
OGFYJ	1/0	105,500	Solid	.325	.090	.045	.595	400	.100
OGGAD	1/0	105,500	19/.0745	.373	.090	.045	.645	465	.102
OGGEF	2/0	133,100	Solid	.365	.090	.045	.635	490	.0795
OGGHE	2/0	133,100	19/.0837	.418	.090	.045	.690	558	.0811
OGGIG	3/0	167,800	Solid	.410	.090	.045	.680	635	.0630
OGGJA	3/0	167,800	19/.0940	.470	.090	.045	.740	675	.0642
OGGOH	4/0	211,600	Solid	.460	.090	.045	.730	775	.0500
OGGUJ	4/0	211,600	19/.1055	.528	.090	.045	.800	820	.0509
OGGYK	...	250,000	37/.0822	.575	.120	.045	.905	985	.0431
OGHAF	...	300,000	37/.0900	.630	.120	.045	.960	1,224	.0360
OGHEG	...	350,000	37/.0973	.681	.120	.045	1.015	1,322	.0308
OGHIH	...	400,000	37/.1040	.728	.120	.045	1.060	1,488	.0270
OGHOJ	...	450,000	37/.1103	.772	.120	.045	1.105	1,655	.0240
OGHUK	...	500,000	37/.1162	.814	.120	.045	1.145	1,820	.0216
OGHIL	...	550,000	61/.0950	.855	.120	.045	1.185	2,000	.0196
OGIXY	...	600,000	61/.0992	.893	.120	.045	1.225	2,152	.0180
OGJAG	...	650,000	61/.1032	.929	.120	.045	1.260	2,320	.0166
OGJEH	...	700,000	61/.1071	.964	.120	.045	1.295	2,483	.0154
OGJIJ	...	750,000	61/.1109	.998	.120	.045	1.330	2,645	.0144
OGJOK	...	800,000	61/.1145	1.031	.120	.045	1.365	2,800	.0135
OGJUL	...	900,000	61/.1215	1.093	.120	.045	1.425	3,142	.0120
OGJYM	...	1,000,000	61/.1280	1.152	.120	.045	1.485	3,473	.0108

Asbestos-Varnished Cambric
INSULATED BRAID COVERED CABLE

SINGLE CONDUCTOR
FLEXIBLE STRANDED—TINNED TYPE "A-9" 600 VOLTS

Code	Conductor Size B. & S.	Conductor Size C.M.	Stranding	Diam. Bare Cond., Ins.	Insulation Thickness, Inches 1st Asb.	Insulation Thickness, Inches V.C.	Insulation Thickness, Inches 2nd Asb.	Braid Thickness, Ins.	Over-all Diam., Ins.	Net Wght. Lbs./1,000′	Aver. Resistance Ohms/1,000′ @ 25°C.
OFVOC	14	4,107	41/.010	.075	.010	.030	.015	.045	.275	46	2.769
OFVUD	12	6,530	65/.010	.095	.010	.030	.015	.045	.295	58	1.747
OFWAZ	10	10,380	105/.010	.120	.010	.030	.015	.045	.320	73	1.081
OFWEB	8	16,510	133/.0112	.168	.010	.030	.015	.045	.370	112	0.702
OFWIC	6	26,250	133/.0141	.212	.010	.030	.015	.045	.415	147	.438
OFWOD	5	33,100	133/.0158	.237	.010	.030	.015	.045	.440	165	.349
OFWUF	4	41,740	133/.0177	.266	.010	.030	.015	.045	.470	202	.278
OFWYG	3	52,640	133/.0199	.299	.010	.030	.015	.045	.500	248	.220
OFYBE	2	66,370	133/.0224	.336	.010	.030	.015	.045	.540	309	.170
OFYCA	1	83,690	259/.0180	.378	.015	.030	.030	.045	.620	381	.139
OFYZO	1/0	105,500	259/.0202	.424	.015	.030	.030	.045	.665	460	.110
OFZDA	2/0	133,100	259/.0227	.477	.015	.030	.030	.045	.720	560	.0856
OFZYJ	3/0	167,800	259/.0255	.536	.015	.030	.030	.045	.775	684	.0679
OGABY	4/0	211,600	259/.0286	.600	.015	.030	.030	.045	.840	826	.0540
OGAGD	...	250,000	427/.0242	.653	.020	.040	.040	.045	.945	1,013	.0459
OGALJ	...	300,000	427/.0265	.716	.020	.040	.040	.045	1.010	1,181	.0383
OGAMK	...	350,000	427/.0286	.772	.020	.040	.040	.045	1.065	1,357	.0329
OGARP	...	400,000	427/.0306	.826	.020	.040	.040	.045	1.120	1,543	.0287
OGAVS	...	450,000	427/.0325	.878	.020	.040	.040	.045	1.170	1,734	.0255
OGAWT	...	500,000	427/.0342	.923	.020	.040	.040	.045	1.215	1,895	.0230
OGBAY	...	550,000	427/.0359	.969	.020	.040	.040	.045	1.260	2,073	.0209
OGBEZ	...	600,000	427/.0380	1.027	.020	.040	.040	.045	1.320	2,239	.0186
OGBIB	...	650,000	427/.0390	1.053	.020	.040	.040	.045	1.345	2,408	.0177
OGBOC	...	700,000	427/.0403	1.088	.020	.040	.040	.045	1.380	2,580	.0166
OGBUD	...	750,000	427/.0420	1.134	.020	.040	.040	.045	1.425	2,759	.0152
OGCAZ	...	800,000	427/.0427	1.153	.020	.040	.040	.045	1.445	2,924	.0147
OGCEB	...	850,000	427/.0446	1.204	.020	.040	.040	.045	1.495	3,082	.0135
OGCIC	...	900,000	427/.0453	1.222	.020	.040	.040	.045	1.515	3,263	.0131
OGCOD	...	950,000	427/.0472	1.274	.020	.040	.040	.045	1.565	3,424	.0121
OGCUF	...	1,000,000	427/.0480	1.295	.020	.040	.040	.045	1.585	3,590	.0117

"STANDARD" CABLES FOR MINES
Mill and Underground

The application of wire and cable to mines, both above and below ground requires, quite frequently, special consideration, due to the unusual conditions encountered. Extreme moisture is usual below ground, considerable condensation and damp atmosphere in the mill buildings; and in many cases the moisture is combined with chemicals which would rapidly injure many of the standard protective materials.

The reduction of fire hazard is of course of particular importance.

Canada Wire & Cable Company's engineers maintain close contact with mining electrical development and are therefore competent to recommend the most suitable cable for any condition. Some of the special cables listed below are the result of close co-operation with mine electrical engineers, who have suggested various features in make-up.

INSULATION

Since the working voltage below ground and in the mill buildings rarely exceeds 4,000 volts, and excessive moisture is a common condition, rubber is the preferred insulation. For hot locations in mill buildings, asbestos-varnished cambric insulation is recommended.

Power feeders between distribution substations located above ground are usually paper insulated lead sheathed cables installed in ducts, or double steel tape armoured and installed directly in the earth.

PROTECTIVE COVERING

For protection against moisture a lead sheath, or rubber sheath is recommended, lead being preferred for all important power or control cables. Where local rules do not permit the use of a rubber sheath due to the danger of fire, a NEOPRENE sheath is recommended.

Where severe abrasion may occur during installation, or mechanical protection is required, a steel wire or steel tape armour is recommended. Vertically suspended cables, as in mine shafts require a steel wire armour as described on

pages 23-25. Double steel tape armouring is suitable for non-vertical cables.

Smaller control, signal, or telephone cables may be armoured with interlocking steel tape armour as described in this section under "TECK" flexible armoured cable.

PROTECTION FROM CORROSION

For protection against ordinary rusting from dampness, galvanized steel wire or tape is generally sufficient, although for cables permanently buried in the ground, impregnated jute covered steel tape armour is recommended. This type of cable is illustrated and described on page 20.

Where injurious chemicals are present, special precautions are necessary to protect metallic armouring. In most cases, a coating of Venezuelan asphalt over the armouring itself and in the overall jute, if the latter is used, is sufficient. This treatment has been found particularly suitable as a protection against weak sulphuric or sulphurous acid solutions,—a condition of frequent occurrence. Usually the coating is factory applied, and retouched by hand application of cold asphaltic compound after installation where necessary.

Where cyanide is present, copper armouring has proved most suitable. For large cables, however, this is usually too expensive, but is frequently used in the form of interlocking tape on "Teck" and similar small cables. Large armoured cables are protected with a coating of Venezuelan asphalt as previously mentioned.

Rubber, or Neoprene jacketted cables are also particularly resistant to injury from the more common chemicals, but their use is frequently limited due to the desirability of more adequate mechanical protection.

Many combinations of protective coverings are available to suit special conditions and Canada Wire and Cable Co's engineers will be pleased to make recommendations for any specific condition.

The following are some of the many types of mining cable available:

STEEL WIRE ARMOURED

For permanent shaft installation, see pages 23-25.

DOUBLE STEEL TAPE ARMOURED

For permanent distribution systems between substations, mill buildings, etc., or for main feeders in the buildings themselves, and distribution in the mine, except shaft installation, see pages 20-22.

SUPER MILL CABLE

For control, lighting, and small motor circuits above or below ground, especially where moisture or chemical conditions make conventional wiring methods and metallic protection impractical or short-lived.

Consists of 2 or 3 tinned stranded copper conductors insulated with 30% rubber, each conductor having an identifying coloured rubber. Insulated conductors are cabled together with strong jute fillers with a rubber faced tape over the core.

Over all is a double rubber jacket, the inner jacket being of 30% rubber, and the outer 40% rubber. Between the two jackets is a tinned copper braid, serving both as a ground shield and as a reinforcement for the jacket. This jacket is not flame-resistant and therefore cannot be used as permanent wiring in some localities. Where a flame-resistant jacket is obligatory, a Neoprene outer jacket is acceptable.

TYPE "S" FLEXIBLE ARMOURED

For shaft and mill installation. Has not as much mechanical protection as steel wire armoured cable, nor the longitudinal strength, and must be frequently supported during installation and in service in the shaft. The conductor insulation is protected by the high grade rubber jacket against air and moisture. Eliminates necessity of conduit in mills. Light, flexible and easy to handle. Excellent in three conductor for small power circuits and two conductor for underground lighting and telephone.

"TECK" FLEXIBLE ARMOURED

For shaft and mill installation. Similar to Type "S." except the rubber jacket is of 30% rubber and is not lead moulded. The jacket accordingly is not as resistant to abrasion, but this quality is not essential under the armour. This type of cable is cheaper than the Type "S." Armoured.

TYPE "S" LEAD COVERED

For shaft and mill installation. The lead sheath adds to the weight of the cable, but provides excellent protection against flame, oil and oxidation. Heavier than Type "S." Armoured, and must be supported at frequent intervals during installation and in service in the shaft.

PLAIN LEAD COVERED

For mill installation in ducts, conduit, or cableways, that is, where the cable is not exposed to mechanical injury. The substantial lead sheath seals the conductor insulation against the effect of air and moisture.

TYPE "S" PLAIN

For shaft installation. Light, flexible and easy to handle, but without the mechanical protection of the armoured cables. Must be supported at frequent intervals during installation, and in service to relieve the conductors of cable weight. This type of cable is not protected against fire. The high grade lead moulded 40% rubber jacket is of the same quality as Type "S." Rough Usage Cables, and is recommended in preference to the other types of non-armoured cables.

"TECK" PLAIN

For shaft installation. Similar in construction to Type "S." Plain except that the rubber jacket is of 30% rubber, not lead moulded, and is not as resistant to abrasive wear. The overall tape facilitates handling in wet locations during installation. Offered as an alternative to Type "S." where low first cost is a major factor. Must be supported at frequent intervals during installation and in service. Not flameproof.

McINTYRE SPECIAL

For shaft installation. This type of cable has been installed in a number of mines to reduce first cost. We recommend Type "S." plain or "Teck" plain in preference, due to the higher quality of the rubber jacket on these cables for the protection of the conductor insulation. McIntyre Special is not flameproof, and requires supporting at frequent intervals similar to Type "S." and "Teck."

INSTALLATION OF CABLES

Several excellent publications are available giving information on the construction of underground conduit systems and the methods of installing and jointing cables; among which are the "Underground Systems Reference Book" published in 1931 by the National Electric Light Association, and "Electrical Distribution Engineering" by H. P. Seelye, published in 1930. The notes which follow cover the subject only in a general way, details being readily available in the above-mentioned publications and many others.

TYPE OF INSTALLATION

Many factors influence the type of cable installation to be employed, among which are the physical and sometimes chemical or thermal conditions along the cable route, the cost of the installation in relation to its importance and occasionally the electrical limitations of the cable itself. It is important to note that the cable to be used is closely related to the manner in which it is to be installed, and to the conditions to which it will be subjected after installation.

In general, there are five types of installation as follows:

(a) Underground, in ducts.
(b) Underground, buried directly in earth.
(c) Overhead, on messenger wire or clamped to parts of buildings or other structures, either outdoors or indoors.
(d) Vertically, in shafts or bore-holes.
(e) Submarine.

(a) UNDERGROUND, IN DUCTS

For important installations, where future growth of electrical load, necessitating the installation of additional cables at a later date is probable, or where maximum operating flexibility is desired, and quick replacement of sections in trouble is essential, this type of installation is ideal.

Materials

Modern duct systems comprise a number of fibre, asbestos, or single way vitrified clay tile conduits, encased in concrete with 1-1/2″ to 2″ thickness of concrete between conduits, buried in the ground to a minimum depth usually about 30″. Multiple tile duct may be used for communication cables but not for power cables.

Size of Conduits

Conduits vary from 2″ to 5″ in diameter, 3-1/2″ and 4″ diameter conduits being the most common. The modern trend is decidedly toward the use of larger conduits. Very few of the important users are installing conduits smaller than 4″ diameter.

For new power cable installations, it is good practice to install a duct having a diameter about 1″ larger than the diameter of the cable. This will ensure ease in pulling in the cable, besides providing for its possible replacement by a slightly larger cable in the future. Larger ducts permit more "snaking" of the cable during load cycles and decrease the amount of working of the lead sheath at the duct mouth.

Duct Location and Design

Several factors govern the location and route of a duct system, among which are:

(1) The most desirable location of manholes.
(2) Avoiding surface or sub-surface obstructions.
(3) Avoiding curves in the duct system as far as possible.

In designing the arrangement of the ducts, it is important to keep in mind that the heat generated by the cables is dispersed radially outwards in all directions through the soil. From this consideration therefore, it is important to

ensure that the duct system is surrounded with soil having good heat conductivity. Cinders or loose stone for this reason should not be used in back-filling. It is advisable also to so arrange the ducts that all heavily loaded cables may be installed in "outside" ducts, i.e., in those nearest the surrounding soil. Cinder back-fill is particularly objectionable as likely to provide conditions injurious chemically and electrolytically to the lead sheath.

Where the arrangement of ducts is such that some are "interior" ducts; for example, in a layout having four rows, with four ducts in each row, it is usual to reserve, if possible, all interior ducts for such cables as control, communication, or signal cables which generate little or no heat.

Manhole location is governed generally by the necessity for branch feeders, changes in direction of the duct system, cable terminations, and in the case of long runs, intermediate manholes are necessary to ensure ease in pulling the cable without injury. In the latter case, the spacing of manholes depends upon the size of the cable.

Plain lead sheathed cable is generally used for installation in duct systems. Where soil conditions are such as to provide solutions in wet ducts likely to attack the lead sheath, special coverings for protection of the lead can be applied.

Since plain lead sheathed cables are generally used in underground duct systems, an important precaution in installation is that of ensuring that the lead sheath is not damaged. Chipped ducts if clay tile ducts are used, rusted steel conduits, pieces of cement or other hard substances left in the duct system, have caused serious damage to lead sheaths.

It is important, therefore, to ensure that the duct system is thoroughly clean before commencing to pull in the cable. In addition, the liberal use of a lubricant such as soapstone or grease, applied to the cable at the duct mouth is recommended.

Excessive bending of the cable is another cause of injury, not only to the lead sheath, but to the insulation, especially paper or varnished cambric.

Sheath failures have occurred also by abrasion of the duct mouth in manholes, particularly where the cable is permitted to lie over a sharp or rough edge at the end of the duct. In this case, abrasion is accelerated by elongation and contraction of the cable due to the heating and cooling in conformity with changes in the electrical load. Duct mouth shields having a rounded edge are available; these shields being suitable for installing in the duct mouth after the cable has been installed.

Proper manhole space and training is necessary to provide for the expansion and contraction and prevent the consequent bending concentrating at one point causing transverse cracking of the lead at that point.

Excessive pulling strain must also be avoided, a common mistake being the attempt to pull the cable around too sharp a bend.

(b) **UNDERGROUND, BURIED DIRECTLY IN EARTH**

This method is preferred for isolated circuits where an increase in load, requiring additional cables is not expected; for example, exterior lighting, railway signals, etc., or where the cost of a duct system is not warranted.

In installing a cable by this method, the cable is laid at the bottom of a trench usually from 18″ to 30″ deep. If two or more cables are to be installed, a separation of at least 6″ is recommended between cables.

In back-filling, care should be taken to ensure that the cables are surrounded by soil having good heat conductivity, —loose stone or cinders are therefore to be avoided.

Steel tape armoured, lead sheathed cables are best for this type of installation, since the armouring may be relied upon to protect the cable from damage from sharp stones, or other injurious material either during or after installation.

Where future excavation work near the site of the buried cable is probable, it is advisable to guard the cable against damage during excavation, by placing a warning or protective material over the cable throughout its length. For this purpose, a specially developed clay brick, or creosoted

wood planking is commonly used, laid on top of the first 2″ or 3″ of soil covering the cable with the back-fill laid thereover. Untreated planking should not be used. In addition, where possible, it is advisable to place markers at ground surface denoting the location of the cable.

(c) OVERHEAD ON MESSENGER WIRE OR CLAMPED TO WALLS, ETC.

(1) On Messenger Wire

This method is used occasionally where underground installation is not feasible, particularly where space can be obtained on an existing transmission pole line. It is used occasionally also in industrial plants between buildings or in tunnels, and is particularly favoured in mines.

Where the cable is not likely to be mechanically damaged after installation, for example, on a transmission pole line, an unarmoured lead sheathed cable may be used, the lead sheath having included in it a small percentage of antimony to assist in preventing vibration failures, and "grooving" at the suspension rings.

For installation in tunnels, a galvanized steel tape armoured, lead sheathed cable is recommended.

It is important to note that exposure to the heat of the sun results in a very material reduction in the allowable current carrying capacity of the cable.

(2) Clamped to Building Walls, Etc.

This is a convenient method of installing distribution feeders in industrial plants and other large properties, particularly for the larger feeders which otherwise would require the use of heavy conduit. Quite frequently the overall cost of this type of installation is appreciably lower than the equivalent conduit installation, especially where bends and offsets are required.

For exterior installation, jute covered double steel tape armoured lead sheathed cable is generally used, and for interior installation, galvanized double steel tape armouring is preferred.

The cable should be loosely supported in clips about 4 or 5 feet apart. Varnished cambric, or rubber insulated cable is generally used for branch feeders in industrial buildings, in which case, connection to distribution panels and junction boxes is made by means of standard box connectors, locknuts and bushings, as used for the nearest size of flexible conduit.

Main feeders, however, quite frequently are paper insulated cables, requiring Ozite-filled potheads at each connection.

(3) **Supported on Racks, or Cable Trays in Power Houses, Cable Tunnels, Etc.**

This is often a convenient method of installing cable, since advantage can frequently be taken of available unobstructed space in existing tunnels or on walls. Here, plain lead sheathed cables may be used provided that there is no danger from damage to the sheath after installation. Galvanized armoured cable is recommended where such a danger exists.

Where metal trays or continuous shelves are used, provision should be made to permit the cable to expand longitudinally without falling off the support. A wide tray, permitting the cable to "snake" or a number of smooth blocks placed under the cable at intervals are suitable for this purpose.

In tunnel installation it is important to avoid proximity to steam pipes.

Exposed power cables under this classification should be fire-proofed as described on Page 214.

(d) VERTICALLY IN SHAFTS OR BORE-HOLES

The main problem in vertical suspension of cables is to ensure that the weight of the cable is not permitted to apply injurious mechanical stresses to the lead sheath, insulation or conductors during installation, or while suspended over a period of time during operation.

For this reason a steel wire armoured cable is used as described on pages 23-25.

In installation, the cable, if the cage size permits, is lowered to the bottom of the shaft on the reel, and the cable itself hoisted upwards, taking care that the "head serving" is used as the point of attachment for the hoisting rope fitting. For this arrangement the head serving should be placed on the outer end of the cable (i.e., the end to come first off the reel).

When the head serving alone is to support the cable as in a bore-hole, it should rest on a snug fitting clamp adequately supported on proper foundation members.

Where the reel of cable is too large to be lowered into the shaft the cable is mounted on the surface, carefully braked, and lowered by lashing at frequent intervals to the hoist ropes as the cable is paid out. For this arrangement the head serving should be on the innermost end of the cable on the reel. When the cable is at the proper position, it is transferred to the shaft timbers, usually being clamped every ten to twenty feet although the head serving alone is capable of supporting the cable up to lengths of about 1,000 ft.

High grade rubber insulated, lead sheathed, armoured cable is most commonly used for this purpose, the rubber being preferred since it contains no fluid constituent which might migrate down the cable. Varnished cambric insulated and paper insulated cables are, however, utilized where special conditions necessitate their use.

(e) SUBMARINE

Since practically every submarine cable installation presents a special problem of its own, there is no standardized procedure.

Such factors as the length and size of the cable, the nature and depth of the channel, speed of current, equipment available, the necessity for, and location of splices, location of shore end structures, etc., each have a bearing on the method of installation.

There are, however, a few general precautions to be taken in any submarine installation and the notes which follow cover these only.

(1) **Location**

Whenever possible, it is desirable, but not essential, to lay a submarine cable in a single length without splices. The limit to the single length is fixed by the size of the cable, and the manufacturing and shipping facilities.

It is important to ensure that the cable be not permitted to sway in service. A location should be chosen therefore where the cable will rest on the ground throughout its length, and will not be in danger of disturbance by shipping, anchors, etc.

(2) **Installation**

In installing a submarine cable, as with all cables, it is most important to avoid damaging the lead sheath or insulation. Of almost equal importance, however, is the necessity of maintaining sufficient tension in the cable to ensure that the cable will not "kink" under water. The installation procedure should therefore be planned with these dangers particularly in mind. With these provisions, short cables may be installed by setting up the cable reel on shore and pulling across the channel, using a winch or rope, taking care that the cable reel does not "over-run". The cable is usually retarded by applying a brake to the cable reel, or to the cable itself after it has left the reel.

Where the above method cannot be used, i.e., where the pulling strain would be likely to be too great, or the channel so wide as to necessitate one or more joints in the cable, the cable is installed from a scow or raft.

In this method, the cable, if in a short single length without joints, can be installed directly from the reel mounted on the raft as the latter progresses across the channel. Longer lengths, and cables which require joints are removed from their reels and laid out in "figure 8" or coiled on the deck of a scow. Care is essential that the cable will not be kinked when being coiled on the scow or when paying out during the laying operation. "Figure 8" requires a larger scow and is favoured when one is available. Coiling permits the use of a smaller scow but requires an

overhead framework to be erected over which the cable may be run in laying.

Joints should be made before laying operations start, particularly where river or tidal currents occur at the crossing. Joints made during the laying operation are always hazardous, especially so when currents of water are involved. The long continued vibration of the cable is very liable to crack the lead sheath.

During laying operations tension should be kept on the cable by suitable braking to ensure that loops and consequent kinks will not be laid into the cable. This is a most important point.

Since submarine cable installations are particularly prone to develop unusual conditions, it is best economy to employ the services of a thoroughly experienced submarine cable supervisor to superintend operations.

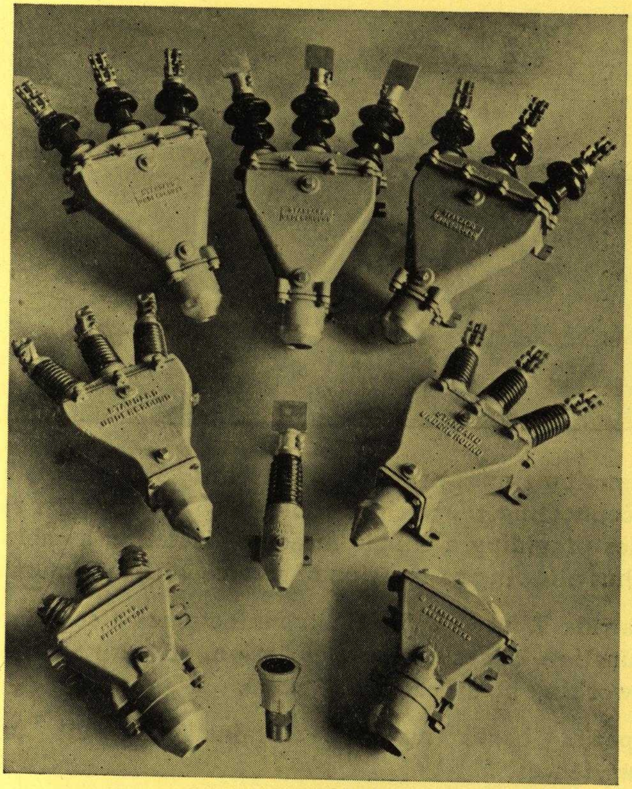
FIRE-PROOFING OF CABLES

All plain lead sheathed cables exposed in manholes, tunnels, or mounted on walls, etc., should be covered with fireproof protection. This is in order to avoid or minimize injury due to failures of adjacent cables or other short-time fires or flashes.

The preferred method is to apply a helical layer of asbestos listing of from two to three inches in width, at least one-third lapped, throughout the length of the exposed cable. The asbestos listing is generally reinforced by soaking in a solution of silicate of soda and applying while still wet.

There are various other methods, usually based on combinations of portland and asbestos cement and tapes or nettings.

CABLE POTHEADS



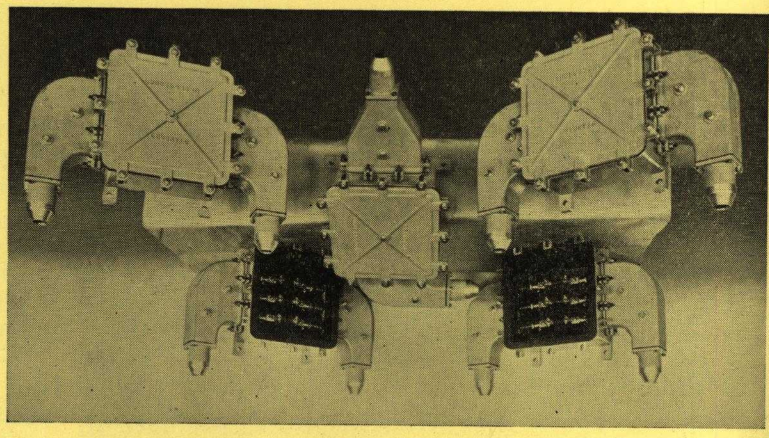
Canada Wire & Cable Co. manufacturers a complete line of Potheads of its own design; this design resulting from intimate knowledge of the problems involved in cable engineering and installation.

Potheads are available for all classes of service, from the inexpensive "Low Voltage" type to the "Oil-Filled" type, designed and manufactured for an operating voltage up to 66,000 volts.

These Potheads are described and illustrated in our Catalogue No. A-34, which includes full details of installation.

A copy of this catalogue, or subsequent revisions thereto will be glady furnished upon request.

JUNCTION BOXES



Junction Boxes provide an extremely flexible method of interconnecting the various cables of a distribution system, besides providing a simple means of isolating a cable fault and thus allowing restoration of service with minimum delay.

Canada Wire & Cable Co. manufacturers a complete line of Junction Boxes of its own design, and are standard up to a working pressure of 2500 volts.

Special boxes may be obtained to suit unusual circumstances.

A typical range of Junction Boxes are described and illustrated in our Catalogue No. A-34, a copy of which will be glady furnished upon request.

JOINTING PROCEDURE
For
3 CONDUCTOR PAPER INSULATED, LEAD SHEATHED CABLE—STRAIGHT JOINT

In jointing paper insulated lead covered cable, it is of vital importance to adopt only those methods and materials shown by experience to be best suited to the work at hand, and to proceed in a well-considered series of steps in a methodical way from the time the cable is cut until the joint is completed.

It is extremely important in carrying out the work that nothing is done to damage in any way the insulation or to roughen the strands or other metallic conductors. Moisture from the hands or other sources—dust, dirt, flakes of solder or other foreign materials—must also be excluded from the joint and the hand-applied insulation placed in such a way as to avoid air pockets between the conducting parts and the insulation and between layers of insulation.

Any sharp point or projection of the conducting parts produces an air pocket when covered by insulation so that

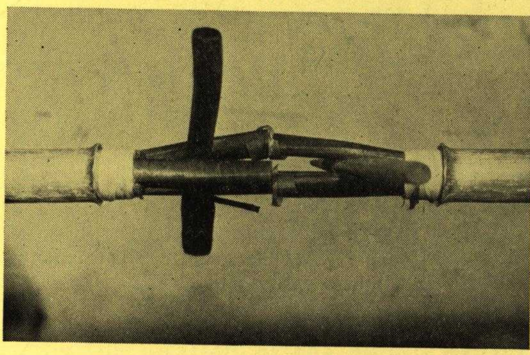


Fig. 1—The last three layers of insulation must be torn off, and not cut.

great care must be taken to avoid all metallic projections, high points on insulation, burrs and cuttings and have the conductor, solder and sleeve "streamlined" before applying the insulation.

Excessive bending of conductors may loosen or tear the paper insulation. The crotch, or where the conductors enter the belt insulation, is a vital point in any joint. Every effort must be made not to disturb the insulation at and near this point.

Paper or V.C. insulation may be cracked in cold weather if bent even to otherwise normal curvatures. Extra precautions should be taken in the winter to warm badly frozen cable before bending.

It will be noted that these instructions do not differentiate between the various conductor sizes or voltages in respect to the length of joint. It is recognized that there could be some saving in materials by designing each joint closely to fit the respective requirements, if large numbers are involved.

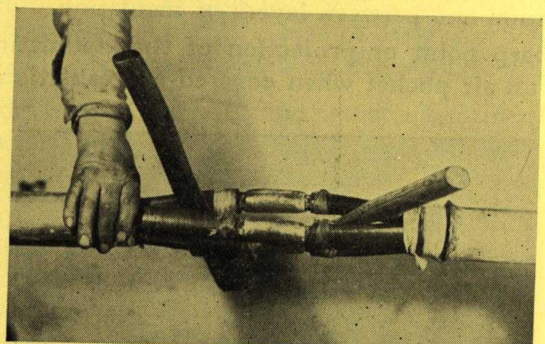


Fig. 2—Connectors are soldered solidly into place and all burrs smoothed off.

PRECAUTIONS

Since making the joint necessitates exposing the insulation and conductors at the cable ends, preliminary preparations must be made to ensure that they be exposed only under the best possible conditions and for the shortest possible time consistent with obtaining a thoroughly reliable job.

These precautions will include the following:

(a) Choose, if possible, a warm dry day and provide protection against dirt-laden wind and condensation of moisture at the joint location.

(b) Have all tools clean, warm and dry.

(c) Keep all hand-applied insulation in the containers until immediately required.

(d) Heat the Ozite filling compound as specified on the container, using a thermometer to ensure the proper pouring temperature.

JOINTING PROCEDURE

(a) *Preparing the Cable.*

Form the cable ends as nearly as possible in their final position, allowing the ends to overlap about 12 inches. It is important that the cable be so arranged that the joint will lie straight and well-centred within the lead sheath when wholly assembled.

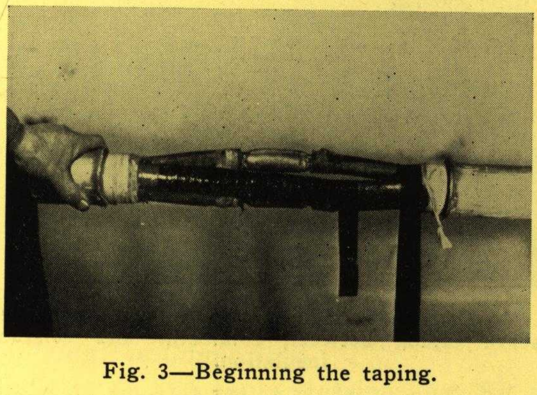


Fig. 3—Beginning the taping.

Determine the location of the middle of the joint and cut both cables through at this point with a hacksaw, so that the cable ends will butt squarely together.

(b) *Preparing the Lead Splicing Sleeve.*

Scrape both ends of the lead sleeve with a shave hook or rasp for about 3 or 4 inches and cover the cleaned portions immediately with stearine flux.

Slip the lead sleeve over one end of the cable and away from the joint location.

(c) *Removing the Lead Sheath.*

Mark the lead sheaths on both sides of the middle of the joint at a distance of about 1½″ less than half the length of the sleeve. Score the lead squarely around the circumference at these points to a depth not exceeding *one half* the thickness of the sheath.

Scrape the lead sheaths to a distance of about 3 inches beyond this mark and cover immediately with stearine flux.

Split the lead sheaths from the scored circumference to the end, *taking care* not to damage the paper belt insulation.

NOTE:—The lead sheath is usually scored and cut by means of a plumber's chipping knife and hammer.

Tear off the lead sheaths and "bell" out and trim free of sharp edges the remaining end of the sheath on the cables.

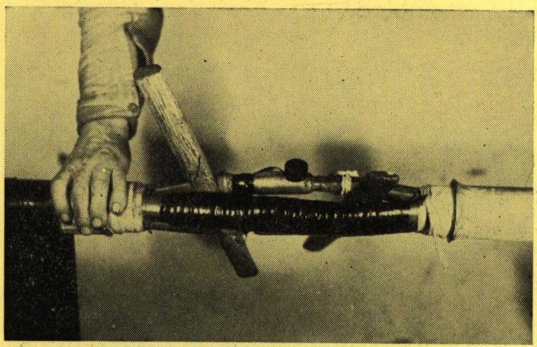


Fig. 4—Ends of conductor have been "pencilled." Observe taping between connector and conductor insulation.

Only fibre or wood wedges should be used on "belling" out the lead sheath on the cable.

(d) *Removing the Insulation.*

Tie with saturated flax twine and apply a temporary serving of dry cotton tape over the belt insulation on both cables at a point 1¼ in. from the end of the lead sheath. Remove it to this point, taking care not to cut the insulation on the conductor. The last three layers of insulation must

be torn off and not cut to prevent any damage to conductor insulation. (See Fig. 1.) Remove the fillers also to this point.

Bind the conductors tightly together with cotton tape immediately beyond the remaining belt. Spread the conductors apart with smooth fibre or wood wedges only, forming them into their final position in a long, easy curve. As this is one of the most vital parts of the splicing operation, extreme care must be taken not to bend the insulated conductors at any point more sharply than when they were on the manufacturer's reel. *No reverse bending* is permitted.

Tie the insulation of each conductor with dry cotton tape at a point that will be ⅝ in. from the end of the connector when installed. Then remove the insulation from the end of the conductor to this point, tearing off last three layers of insulation to prevent cutting or marking of conductors. (See Fig. 2.)

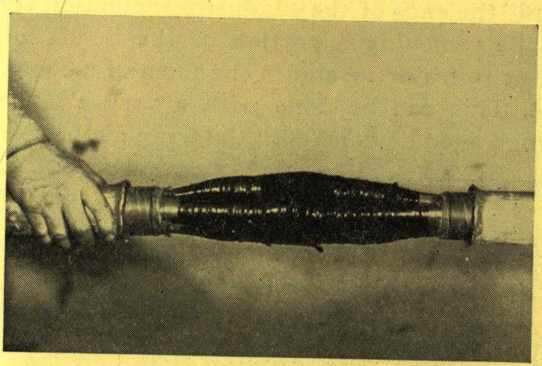


Fig. 5—1 inch x 12 mil bias-cut V.C. tape applied half lap with number of layers as set forth in table A.

(e) *Applying the Connectors.*

Clean the strands and apply stearine flux. Fit the connectors into place over the conductors with the slot toward the top, being sure that the conductors are butted inside the connectors.

Squeeze the connectors down tightly on to the conductors with a screw vise, making sure no strands project through the slot of the connectors.

Protect adjacent conductors carefully from spilled solder with a piece of canvas.

Apply stearine flux to the connectors, particularly in the slot, thoroughly tin the connectors and conductors by pouring hot wiping solder over them.

Wrap cotton tape tightly on the conductors between the end of the connectors and the conductor insulation with the first turn of the tape half-way up slope of connector.

Solder connectors solidly in place.

While still hot, smooth off *all* burrs with a piece of cotton tape.

Remove the cotton tape from the ends of the connectors and smooth off all burrs, leaving *an absolutely* smooth surface overall. Sharp points are to be avoided at all costs. (See Fig. 2.)

(f) *Pencilling the Insulation.*

"Pencil" the ends of the conductor insulation for a length of ½ in. by removing a portion of the insulation in such a manner as to leave the end in the form of a cone, as shown in Fig. 4. This can be done with a very sharp penknife. "Pencilling" must be done with the wrap of the insulation to

TABLE "A"

MINIMUM LAYERS OF TAPE

Based on Using 1 in. x 12 Mil Bias-cut V.C. Tape Applied Half Lap

Voltages	*Minimum No. Trips and Layers*
550	6 trips=12 layers
2,200	9 " =18 "
6,600	11 " =22 "
13,200	15 " =30 "

NOTE:—The above insulation should be at least equal to double the manufacturer's conductor insulation.

prevent unravelling. The length of the finished "pencilling" should be about four times the thickness of the conductor insulation.

Secure the insulation with dry cotton tape.

After "pencilling" the insulation on any conductor, the hand-applied insulation should be immediately applied as described in Section (g), before proceeding with the next conductor.

(g) *Applying the Tape.*

Fill in the space at both ends between the connector and conductor insulation with 3/8 in. x 12 mil bias-cut V.C. applied first followed by 1/2 in. x 12 mil bias-cut V.C. Both tapes are to be applied as tightly as possible without breaking the varnish film. (See Fig. 4.)

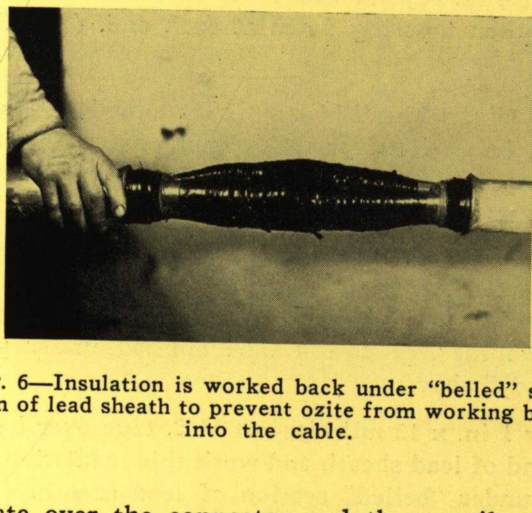


Fig. 6—Insulation is worked back under "belled" section of lead sheath to prevent ozite from working back into the cable.

Insulate over the connector and the pencils up to the level of the factory-applied insulation with 1 in. x 12 mil bias-cut V.C. tape applied half lap. Draw each layer tight to eliminate voids, but take care not to crack the varnish film by too great tension.

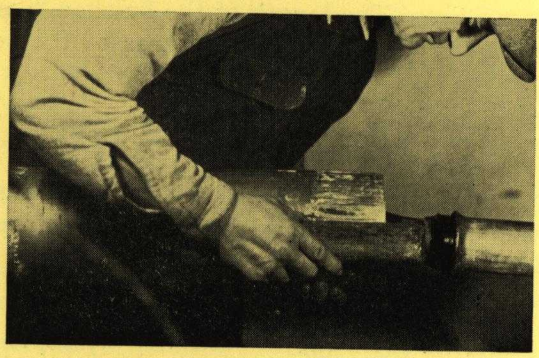


Fig. 7—The lead sleeve is slipped into place.

Remove the cotton tape applied in "(f)" and complete the insulation of each conductor with the 1 in. x 12 mil bias-cut V.C. tape applied half lap with the number of layers applied corresponding to the voltages as listed in accompanying table "A". This insulation will extend to a distance of at least 4 in. beyond where the conductor insulation was removed, then tapering down at each end. (See Figs. 3, 4, 5 and 6.)

Apply 1 in. x 12 mil bias-cut V.C. tape, half lap, to form a smooth belt of uniform thickness, extending to a distance of approximately 2 in. on each side of the middle of the joint, and strong enough to act as a binder. (See Figs. 5 and 6.)

(h) *Completing the Joint.*

Remove the dry cotton tape applied under paragraph one of "(d)" above.

Apply 1 in. x 12 mil bias-cut V.C. tape over belt insulation at end of lead sheath and work this insulation carefully back in under "belled" section of lead sheath. (See Figs. 6 and 7.)

Slip the lead sleeve into place, using care to centre it over the joint. Beat down the ends of the sleeve to fit the lead sheaths of the cables.

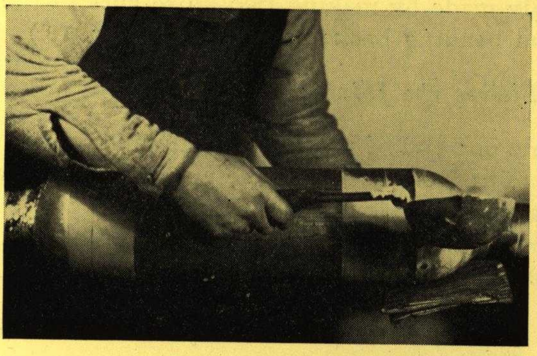


Fig. 8—Paper pasters limit the length of the solder wipe.

Determine the length of the solder wipe required at each end and apply paper pasters to the lead sheath to limit this length, which should be at least 1 in. on each side of the point at which the lead sleeve meets the lead sheath.

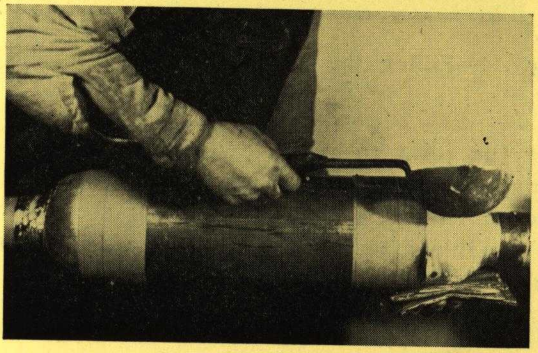


Fig. 9—Completing the plumber's wiped joint.

Make a plumber's wiped joint at both ends. (See Figs. 8 and 9.)

Cut two holes in the upper surface of the lead sleeve, one about 2 or 3 in. from each end, the holes being large enough to admit the stem of a filling funnel. These holes

are readily made by making two knife cuts in the shape of a "V" and bending back the lips. (See Fig. 10.)

(j) *Filling the Joint with Compound.*

Elevate one end of the joint about ¼ in. above the other. Fill the joint from the lower hole with Ozite B compound which has been previously heated to the proper temperature as shown on the label of the container. This temperature should be determined by a thermometer.

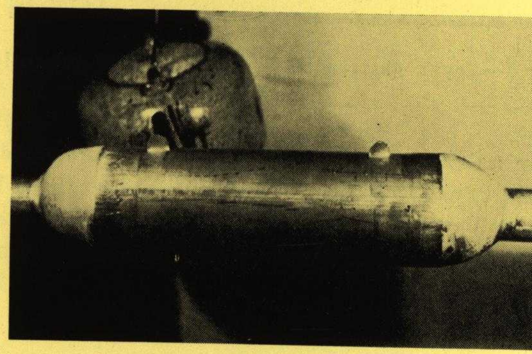


Fig. 10—Filling the joint with compound through V-shaped knife cuts.

Allow the joint to cool slowly in order that the compound may contract fully, then complete the filling from the upper hole. N.B.—This final filling should be done as soon as possible after the joint has cooled, preferably the following day.

Seal the joint by beating down the filling hole lips and solder with half and half solder, using stearine flux. *Care must be taken* that this sealing operation is so effected that the solder does not leak through the hole and form an "icicle" projecting inside the sleeve.

Cut two rectangular patches from a piece of the lead sheath removed in "(c)". Stamp them with the initials of the splicer and the date and solder them over the V lip cuts on the sleeve.

JOINTING MATERIAL FOR PAPER INSULATED LEAD SHEATHED CABLE

SINGLE CONDUCTOR

VOLTAGE	1,000 to 5,000				6,000 to 10,000				11,000 to 15,000			
Conductor size (B. & S. or C.M.)‡	No. 6	No. 1/0	500 MCM.	1,000 MCM.	No. 6	No. 1/0	500 MCM.	1,000 MCM.	No. 6	No. 1/0	500 MCM.	1,000 MCM.
Cable O.D. (inches)	0.54	0.73	1.20	1.55	0.66	0.86	1.32	1.66	0.76	0.96	1.43	1.79
Lead sleeve (inches)	1½x10	1½x10	2x12	2½x16	1½x10	2x12	2½x16	3x18	1½x12	2x14	2½x16	3x18
Wiping solder (lbs.)	1½	1½	2½	3½	1½	2½	3½	4½	1½	2½	3½	4½
½ x ½ solder (lbs.)	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼
Copper connectors	1	1	1	1	1	1	1	1	1	1	1	1
Cotton tape, 9 yds. x ½″	1	1	..	..	1	1	..	..	1	1	..	..
Cotton tape, 18 yds. x 1″	..	..	1	1	..	..	1	1	..	..	1	1
Bias V.C. tape, 2 yds. x ⅜″	1	1	2	2	1	1	2	2	1	2	2	2
Bias V.C. tape, 2 yds. x ½″	1	1	2	2	1	1	2	2	1	2	2	2
Bias V.C. tape, 2 yds. x ¾″	4	..	..	..	8	..	..	..	..	..	..	..
Bias V.C. tape, 2 yds. x 1″	..	6	..	..	..	..	..	..	..	..	..	..
Bias V.C. tape, 18 yds. x 1″	..	..	2	3	..	1	2	4	1	2	3	5
Ozite (Pints)	1	1	1	3	1	1	3	4	1	2	3	4
Stearine (2 oz. cakes)	1	1	1	1	1	1	1	1	1	1	1	1
Paper pasters	10	10	10	10	10	10	10	10	10	10	10	10
Sat. flax twine (ft.)	10	10	10	10	10	10	10	10	10	10	10	10

‡ For intermediate sizes of conductor, use list of material for next larger size of conductor listed, except that connector should be the correct size.

JOINTING MATERIAL FOR PAPER INSULATED LEAD SHEATHED CABLE

THREE CONDUCTOR

VOLTAGE	1,000 to 5,000				6,000 to 10,000				11,000 to 15,000			
Conductor size (B.& S. or C.M.) ‡	No. 6	No. 1/0	500 MCM.	1,000 MCM.	No. 6	No. 1/0	500 MCM.	1,000 MCM.	No. 6	No. 1/0	500 MCM.	1,000 MCM.
Cable O.D. (inches)	1.13	1.39	2.25	2.91	1.26	1.52	2.39	3.04	1.43	1.67	2.54	3.19
Lead sleeve (inches)	2x16	2½x16	3½x18	4½x22	2½x16	2½x16	3½x18	4½x22	2½x16	3x18	4x20	4½x22
Wiping solder (lbs.)	2½	3½	5½	7½	3½	3½	5½	7½	3½	4½	7	7½
½ x ½ solder (lbs.)	½	½	½	½	½	½	½	½	½	½	½	½
Copper connectors*	3	3	3	3	3	3	3	3	3	3	3	3
Cotton tape, 18 yds. x ½″	1	1	..	..	1	1	..	..	1	1	..	..
Cotton tape, 18 yds. x 1″	..	..	1	1	..	..	1	1	..	..	1	1
Bias V.C. tape, 2 yds. x ⅜″	3	3	6	6	3	3	6	6	3	3	6	6
Bias V.C. tape, 2 yds. x ½″	3	3	6	6	3	3	6	6	3	3	6	6
Bias V.C. tape, 2 yds. x ¾″	6	..	..	..	9	..	..	..	..	..	..	..
Bias V.C. tape, 2 yds. x 1″	4	14	26	50	4	8	30	60	15	14	38	76
Bias V.C. tape, 18 yds. x 1″	..	..	1	2	..	1	2	2	..	1	2	3
Ozite (pints)	2	3	5	10	3	3	5	10	3	4	8	10
Stearine (2 oz. cakes)	1	1	1	1	1	1	1	1	1	1	1	1
Paper pasters	10	10	10	15	10	10	10	15	10	10	10	15
Sat. flax twine (ft.)	25	25	25	25	25	25	25	25	25	25	25	25

‡ For intermediate sizes of conductor, use list of material for next larger size of conductor listed, except that connector should be the correct size.

* For sector conductors No. 4/0 B. & S. and smaller, use a connector for one B. & S. gauge larger conductor. For sector conductors larger than No. 4/0 B. & S., use a connector 50,000 C.M. larger.

DIMENSIONS OF SPLIT, TINNED COPPER CONNECTORS

Size Conductor	Inside Diam.	Length, Inches	Approx. Ship. Wt., Per M (lbs.)	Size Conductor	Inside Diam.	Length, Inches	Approx. Ship. Wt., Per M (lbs.)
12 B. & S. Solid	.086	1½	5	000 B.&S. Strand	.475	2	85
11 B. & S. Solid	.096	1½	5	0000 B.&S. Strand	.533	2½	125
10 B. & S. Solid	.107	1½	5	250,000 C.M.	.581	2½	150
10 B. & S. Strand	.116	1½	5	300,000 C.M.	.635	2½	180
9 B. & S. Solid	.119	1½	5½	350,000 C.M.	.690	2½	210
8 B. & S. Solid	.133	1½	6	400,000 C.M.	.740	3	280
8 B. & S. Strand	.151	1½	6½	450,000 C.M.	.784	3	320
7 B. & S. Solid	.149	1½	6½	500,000 C.M.	.826	3	340
7 B. & S. Strand	.169	1½	7½	550,000 C.M.	.868	3	410
6 B. & S. Solid	.167	1½	8	600,000 C.M.	.906	3½	500
6 B. & S. Strand	.189	1½	12	650,000 C.M.	.948	3½	520
5 B. & S. Solid	.187	1½	12	700,000 C.M.	.983	3½	540
5 B. & S. Strand	.211	1½	15	750,000 C.M.	1.018	3½	580
4 B. & S. Solid	.209	1½	15	800,000 C.M.	1.052	4	620
4 B. & S. Strand	.237	2	20	850,000 C.M.	1.083	4	690
3 B. & S. Solid	.234	2	20	900,000 C.M.	1.115	4	750
3 B. & S. Strand	.265	2	25	950,000 C.M.	1.145	4	840
2 B. & S. Solid	.263	2	25	1,000,000 C.M.	1.175	4½	1,030
2 B. & S. Strand	.297	2	35	1,250,000 C.M.	1.320	4½	1,200
1 B. & S. Solid	.294	2	35	1,500,000 C.M.	1.440	5	1,650
1 B. & S. Strand	.337	2	40	1,750,000 C.M.	1.560	5½	2,100
0 B. & S. Strand	.378	2	50	2,000,000 C.M.	1.664	6	2,725
00 B. & S. Strand	.423	2	65	2,500,000 C.M.	1.855	6½	3,300

Connectors No. 1/0 and larger are equipped with a rolled groove opposite the slot. This groove acts as a hinge enabling the cable splicer to quickly and easily close the connector around the cable.

Such connectors are shipped with the slot opening equal to the diameter of the cable thus saving time and eliminating the distortion caused by opening the connector in the field.

CALCULATION OF THE ELECTRICAL PROBLEMS OF UNDERGROUND CABLES

Summary of Formulae

For a more complete treatment of this subject see articles by Dr. D. M. Simmons in the "Electric Journal", issues of May to November, 1932, inclusive.

CABLE DIAMETERS (a) Diameter Under Lead Sheath

Round Conductors:

$Di = d + 2T$ for one conductor cables . . . . (1)

$Di = 2.00\,(d + 2T) + 2t$ for two conductor cables (round duplex) . . . . (2)

$Di = 2.155\,(d + 2T) + 2t$ for three conductor cables . . . . . . (3)

$Di = 2.414\,(d + 2T) + 2t$ for four conductor cables . . . . (4)

Sector Conductors (Approximate):

$Di = 1.42d + 4T + 2t$ for two conductor cables . . . . (5)

$Di = 1.85d + 4T + 2t$ for three conductor cables . . . . (6)

$Di = 2.20d + 4T + 2t$ for four conductor cables . . . . (7)

(b) Overall Diameters

Plain Lead Sheathed Cable:

Add twice the thickness of lead sheath given on page 19.

Lead Sheathed, Double Steel Tape Armoured Cable:

Add the dimension given on page 21 to the overall diameter of lead sheath.

Lead Sheathed, Steel Wire Armoured Cable:

add the dimension given on page 25 to the overall diameter of lead sheath.

RESISTANCE

Conductor:

$$R_T = \frac{234 + T}{259} \times R_{25} \quad \text{. . . . . (8)}$$

Lead Sheath

$$R_S = \frac{0.039228}{r_5^2 - r_4^2} \quad \text{. . . . . (9)}$$

The above formulae is based on resistivity of lead = 26.1 microhm-cm. units at 60° C., this being an average value for practical use.

INDUCTANCE

Self Inductance of Conductor:

$$L = \left(0.1404 \log_{10}\frac{S}{r} + 0.01525\right) \times 10^{-3} \text{ henries to neutral per 1,000 feet} \quad \text{. . . . . . . (10)}$$

NOTE: This equation applies strictly to a straight solid round wire and assumes uniform current distribution over the conductor area. The effect of cable lay, stranding, skin effect, etc., is usually small, although not always negligible.

Mutual Inductance of Conductor and Sheath (Single Conductor Cable):

$$M = 0.1404 \log_{10}\frac{S}{r_m} \times 10^{-3} \text{ henries to neutral per 1,000 feet} \quad \text{. . . (11)}$$

ADDED EFFECTIVE CONDUCTOR RESISTANCE DUE TO INDUCED SHEATH CURRENTS (R_O):

Single Conductor Cables (Equilateral Spacing):

$$R_o = \frac{X^2_M R_s}{X^2_M + R^2_s} \text{ ohms per 1,000 feet} \quad (12)$$

Multi-Conductor Cables:

$$R_o = \frac{396\, S_1^2}{R_s\, r_m{}^2} \times 10^{-6} \text{ ohms per 1,000 feet per conductor} \quad (13)$$

$$S_1 = \frac{1}{\sqrt{3}}(d + 2T) \quad (14)$$

GEOMETRIC FACTOR

Many of the electrical characteristics of cables depend not only upon the specific qualities of the dielectric but also upon its size and shape. In determining these characteristics it is convenient to use certain factors which are purely functions of the geometric properties of the cable. For example, in single conductor cable, the electrical and the thermal resistances of the insulation are proportional to the electrical and the thermal specific resistances of the insulation material, and also to $\log_e (D_i/d)$, where D_i = diameter over the insulation and d = conductor diameter. The dimensions of the cable occur only in the expression $\log_e (D_i/d)$. The same expression enters into the formulae for the determination of capacity, dielectric loss, charging current, etc. and is defined as the geometric factor, G, for single conductor cable.

Single Conductor Cable:

$$G = \log_e \frac{D_i}{d} = 2.303 \log_{10} \frac{D_i}{d} \quad (15)$$

Multi-Conductor Type H Cable:

For the case of multi-conductor Type H cable, a metal layer covers the surface of each individual conductor insulation. These metal layers are in contact with one another and with the sheath and thus create an equipotential surface, making it possible to treat the individual conductors as single conductor cables insofar as calculation of electrical characteristics are concerned, and the expression for geometric factor, G, given above may be used. While this single conductor geometric factor applies strictly to round conductors, the error in applying it to sector conductors is negligible for all practical purposes.

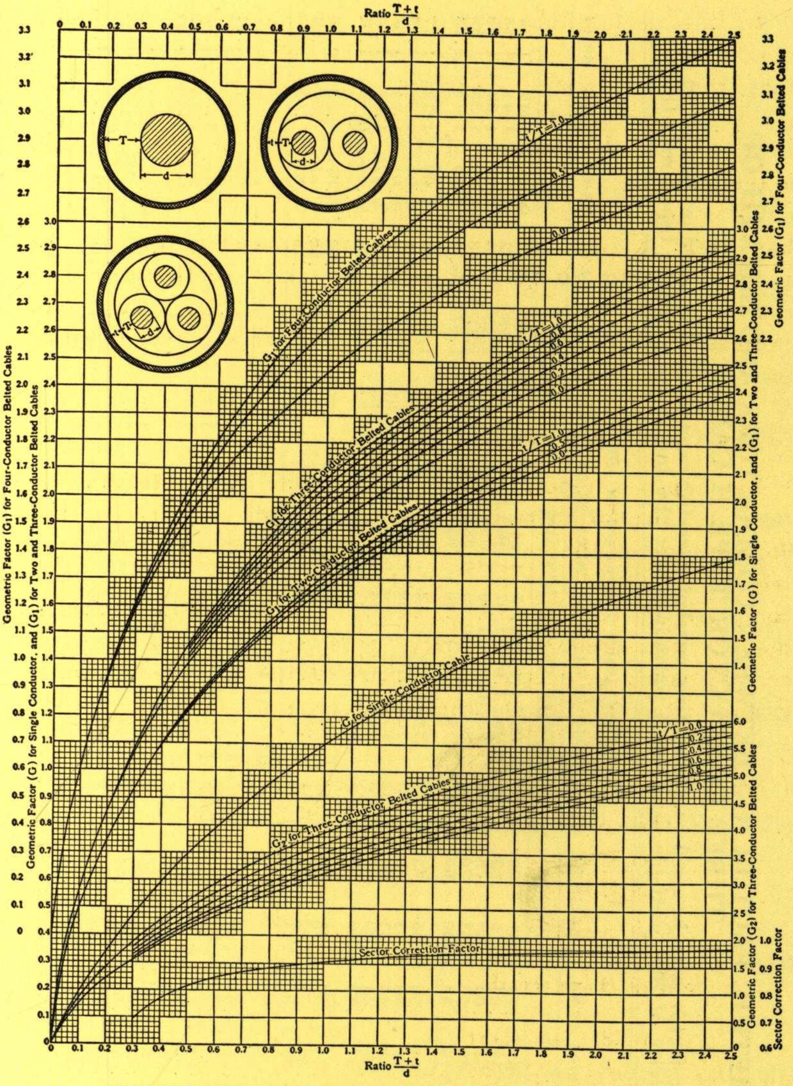
In the calculation of **thermal** characteristics of multi-conductor Type H cable the problem is complicated by the fact that the metallic surface surrounding the individual insulated conductor cannot be considered an isothermal surface owing to the thinness of the copper shielding foil; actually a temperature gradient exists around its periphery when the cable is under load. A mathematical solution to this problem has been obtained which yields an expression for G_1, the geometric factor to be used in determining the thermal characteristics of three conductor Type H cable. From this expression, values of G_1 have been calculated and are presented in the table on page 234.

Multi-Conductor Belted Cable:

For multi-conductor belted cable, such characteristics as capacity, insulation resistance, etc., depend on the electrical connections of the cable, and a different geometric factor is required for each case. For three conductor belted cable there are nine different ways in which capacity (for example) may be measured. The various possible connections and the corresponding geometric factors are as follows, the letters A, B and C referring to the three individual conductors:

Connection	Geometric Factor
A, B and C vs. sheath	G_1 (see chart)
Three phase operation	G_2 (see chart)
A vs. B	$G_3 = 2\,G_2$
A vs. B and C	$G_4 = 1.5\,G_2$
A vs. sheath	$G_5 = \dfrac{3\,G_1 + 2\,G_2}{3}$
A vs. B and sheath	$G_6 = \dfrac{G_2\,(6\,G_1 + G_2)}{3\,G_1 + 2\,G_2}$
A vs. B, C and sheath	$G_7 = \dfrac{9\,G_1\,G_2}{6\,G_1 + G_2}$
A and B vs. sheath	$G_8 = \dfrac{6\,G_1 + G_2}{6}$
A and B vs. C and sheath . . .	$G_9 = \dfrac{4.5\,G_1\,G_2}{3\,G_1 + 2\,G_2}$

Values for G_1 for two, three and four conductor and G_2 for three conductor belted cables are given on the chart on page 233. For sector conductor cables, the sector correction factor obtained from the bottom curve should be applied. All of the other geometric factors are related to G_1 and G_2 and can be calculated as indicated above.



GEOMETRIC FACTORS FOR SINGLE CONDUCTOR CABLE AND MULTI-CONDUCTOR BELTED CABLE WITH ROUND OR SECTOR CONDUCTORS

Geometric factors can be obtained by calculating the ratios $(T+t)/d$ and t/T (d being defined for sector cables as the diameter of a round conductor of the same area as the sector), and then reading the required value of geometric factor from a curve above. The value thus obtained will be the correct geometric factor for a round conductor cable. For sector conductors the values so obtained should be multiplied by the sector correction factor. In cables of the Non-Type H form without belts, such as multi-conductor rubber cables, the first ratio becomes T/d, and $t/T = 0$.

GEOMETRIC FACTOR (G_1) BETWEEN CONDUCTORS AND SHEATH OF THREE CONDUCTOR TYPE H CABLE

This geometric factor is to be used in calculating current carrying capacity and is based on insulation of thermal resistivity of 700* watt-cm. units with wrappings over the insulation of copper tape 3 mils thick.

Size of Conductor B. & S. or C.M.	Insulation Thickness in Inches																
	8/64	10/64	12/64	14/64	16/64	18/64	20/64	22/64	24/64	26/64	28/64	30/64	32/64	34/64	36/64	38/64	40/64
SECTOR CONDUCTORS																	
1/0	.54	.63	.72	.81	.88	.96	1.03	1.09	1.15	1.21	1.26	1.31	1.36	1.40	1.45	1.49	1.53
2/0	.50	.58	.67	.75	.82	.89	0.96	1.02	1.07	1.13	1.18	1.23	1.28	1.32	1.37	1.41	1.45
3/0	.45	.54	.62	.69	.76	.83	.89	0.95	1.00	1.05	1.10	1.15	1.20	1.24	1.29	1.33	1.36
4/0	.41	.49	.57	.63	.70	.76	.82	.87	0.93	0.98	1.03	1.08	1.12	1.16	1.20	1.24	1.28
250,000	.39	.46	.53	.60	.66	.72	.78	.83	.89	.93	0.98	1.03	1.07	1.11	1.15	1.19	1.23
300,000	.37	.44	.50	.56	.62	.68	.73	.78	.84	.88	.93	0.97	1.01	1.05	1.09	1.13	1.17
350,000	.35	.41	.48	.54	.60	.65	.70	.75	.80	.84	.89	.93	0.97	1.01	1.05	1.08	1.12
400,000	.33	.40	.46	.51	.57	.62	.67	.72	.76	.80	.85	.89	.93	0.97	1.01	1.04	1.08
450,000	.31	.38	.44	.49	.55	.60	.64	.69	.74	.78	.82	.86	.90	.94	0.97	1.01	1.04
500,000	.30	.37	.43	.48	.53	.58	.63	.67	.72	.76	.80	.84	.87	.91	.94	0.98	1.01
600,000	.29	.34	.40	.45	.50	.54	.58	.63	.67	.71	.75	.79	.82	.86	.89	.93	0.96
700,000	.27	.32	.37	.42	.47	.51	.55	.60	.64	.68	.72	.75	.79	.82	.85	.88	.91
800,000	.26	.31	.36	.41	.45	.49	.53	.57	.61	.65	.68	.72	.75	.79	.82	.85	.88
ROUND CONDUCTORS																	
1/0	.61	.71	.81	.90	.98	1.07	1.14	1.21	1.28	1.34	1.41	1.46	1.52	1.57	1.63	1.67	1.71
2/0	.57	.67	.76	.85	.93	1.00	1.07	1.14	1.20	1.26	1.32	1.38	1.44	1.49	1.54	1.59	1.64
3/0	.53	.63	.71	.79	.87	0.94	1.01	1.08	1.14	1.20	1.25	1.31	1.36	1.41	1.46	1.51	1.56
4/0	.50	.59	.67	.74	.82	.89	0.95	1.02	1.07	1.13	1.18	1.24	1.29	1.34	1.39	1.44	1.49
250,000	.48	.56	.64	.71	.78	.85	.91	0.97	1.03	1.08	1.14	1.19	1.24	1.29	1.34	1.38	1.43
300,000	.46	.54	.61	.68	.75	.81	.87	.93	0.98	1.04	1.09	1.14	1.19	1.24	1.29	1.33	1.38
350,000	.44	.52	.59	.65	.72	.78	.84	.90	.95	1.01	1.06	1.11	1.15	1.20	1.24	1.29	1.33
400,000	.43	.50	.57	.63	.70	.76	.82	.87	.92	0.98	1.03	1.07	1.11	1.16	1.20	1.25	1.29
450,000	.42	.49	.55	.62	.68	.74	.79	.85	.90	.95	1.00	1.05	1.09	1.13	1.17	1.22	1.26
500,000	.41	.48	.54	.60	.66	.72	.78	.83	.88	.93	0.98	1.02	1.06	1.11	1.15	1.19	1.23

* While not strictly so, the thermal resistance of Type H Cable is closely proportional to the thermal resistivity, so that the above geometric factors may be used for other resistivities with a reasonable degree of accuracy.

CAPACITY (C)

Single Conductor Cable:

$$C = \frac{0.0169\,k}{G} \text{ microfarads per 1,000 feet} \quad (16)$$

Three Conductor Type H Cable:

(Three conductors against sheath):

$$C = \frac{(0.0169)\,(3)\,k}{G} \text{ microfarads per 1,000 feet} \quad (17)$$

(Under three phase voltage):

$$C = \frac{0.0169\,k}{G} \text{ microfarads per 1,000 feet} \quad (18)$$

Multi-Conductor Belted Cable:

$$C = \frac{0.0169\,n\,k}{G_x} \text{ microfarads per 1,000 feet} \quad (19)$$

CHARGING CURRENT (I)

Single Conductor Cable:

$$I = \frac{0.106\,e\,f\,k}{G} \text{ milliamperes per 1,000 feet} \quad (20)$$

Three Conductor Type H Cable:

(Three conductors against sheath):

$$I = \frac{(0.106)\,(3)\,e\,f\,k}{G} \text{ milliamperes per 1,000 feet} \quad (21)$$

(Under three phase voltage):

$$I = \frac{0.106\,e\,f\,k}{G} \text{ milliamperes per 1,000 feet} \quad (22)$$

Multi-Conductor Belted Cable:

(General formula for any connection):

$$I = \frac{0.106\,E\,f\,n\,k}{G_x} \text{ (*) milliamperes per 1,000 feet} \quad (23)$$

LEAKAGE (g)

Single Conductor Cable:

$$g = \frac{0.106\,f\,k\cos\phi}{G} \times 10^{-6} \text{ mhos per 1,000 feet to neutral} \quad (24)$$

Three Conductor Type H Cable:

(Under three phase voltage):

$$g = \frac{0.106\,f\,k\cos\phi}{G} \times 10^{-6} \text{ mhos per 1,000 feet to neutral} \quad (25)$$

Multi-Conductor Belted Cable:

(Under three phase voltage):

$$g = \frac{0.106\,f\,n\,k\cos\phi}{G_2} \times 10^{-6} \text{ mhos per 1,000 feet to neutral} \quad (26)$$

---

* In calculating charging current under three-phase voltage, G_2 being used, E in this formula must be the voltage e to neutral in kilovolts.

For list of symbols, see page 252.

THREE-PHASE DIELECTRIC LOSS (W_{DL})

Single Conductor Cable:

$$W_{DL} = \frac{0.000106\, e^2 f k \cos \phi}{G} \text{ watts per foot of cable} \quad \dots\dots (27)$$

Three Conductor Type H Cable:

$$W_{DL} = \frac{(0.000106)\,(3)\, e^2 f k \cos \phi}{G} \text{ watts per foot of cable} \quad \dots\dots (28)$$

Multi-Conductor Belted Cable:

$$W_{DL} = \frac{0.000106\, e^2 f n^2 k \cos \phi}{G_2} \text{ watts per foot of cable} \quad \dots\dots (29)$$

INSULATION RESISTANCE (R_i)

Single Conductor and Three Conductor Type H Cable:

$$R_i = 0.989\, \varrho_1 G \times 10^{-6} \text{ megohms for one mile} \quad \dots\dots (30)$$

$$\text{or } R_i = K \log_{10} \frac{D_i}{d} \text{ megohms for one mile} \quad \dots\dots (31)$$

Multi-Conductor Belted Cable:

$$R_i = \frac{0.989\, \varrho_1 G^x}{n} \times 10^{-6} \text{ megohms for one mile} \quad \dots\dots (32)$$

or (One conductor against other conductors and sheath)

$$R_i = K \log_{10} \frac{(d + 3T + 2t)}{d} \text{ (approximate) megohms for one mile} \quad (33)$$

Note: For multi-conductor rubber cables equation (31) is used.

IMPEDANCE CHARACTERISTICS OF WIRES AND CABLES AT 60 CYCLES

In the following tables are listed the characteristics affecting impedance calculations for the range of cables most commonly employed in Canada for transmission and distribution circuits. These characteristics are also tabulated for the principal conductors used for overhead lines. While these latter items are not, strictly speaking, Power Cable information, it is felt that their inclusion will be useful to Power System Engineers.

These characteristics are given in terms of the notation used in calculations by the method of symmetrical components. ("Symmetrical Components", Wagner & Evans, McGraw-Hill Book Company.) It is to be noted particularly that the ordinary line-to-neutral characteristics are identical to the positive-sequence characteristics. The zero-sequence characteristics are used for circuits with earth returns.

The data include the following:

For Cables

(a) Positive- and Negative-Sequence Characteristics

(1) Conductor resistance at operating temperature.

(2) Inductive reactance at 60 cycles.

(3) Shunt capacitive reactance at 60 cycles.

(b) Zero-Sequence Characteristics

(1) Series resistance at operating temperature.

(2) Inductive reactance at 60 cycles.

(3) Shunt capacitive reactance at 60 cycles.

For Overhead Lines

(a) Positive-, Negative- and Zero-Sequence Characteristics

(1) Conductor resistance at 50°C.

(2) Partial inductive reactance at 60 cycles.

(3) Partial shunt capacitive reactance at 60 cycles.

(4) Inductive spacing correction factor.

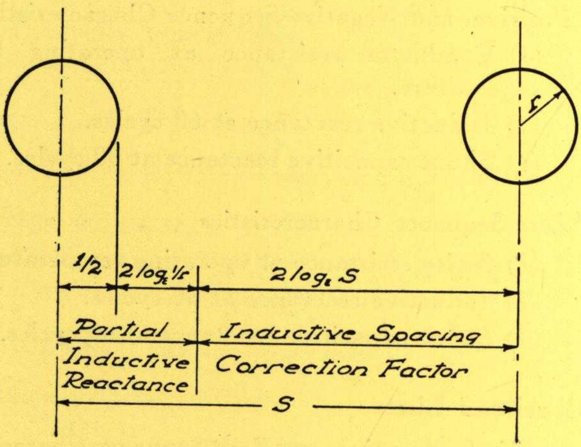
(5) Capacitive spacing correction factor.

(6) Resistance and shunt capacitive reactance ground return correction factors.

In overhead line calculations when the three phase conductors are symmetrically arranged the reactance may be divided into two parts, namely, the internal reactance due to the flux within the conductor, and the external reactance due to the flux between the conductors.

For compactness in tabulation the inductive reactance is divided into (1) the "partial inductive reactance" due to the internal flux plus the external flux to a radius of one foot, which is a function of the conductor size and type only, and (2) the "inductive spacing correction factor" due to the external flux between a radius of one foot and the centre of the other conductors, which is a function of the equivalent spacing only. Similarly the shunt capacitive-reactance may

be divided into the "partial shunt capacitive reactance" and the "capacitive spacing correction factor".



The formula for the inductance of two parallel round wires of radius r spaced at a distance S apart forming a return circuit is

$$L = \tfrac{1}{2} + 2 \log_e \frac{S}{r} \text{ abhenrys/cm.} =$$

$$\tfrac{1}{2} + 2 \log_e \frac{1}{r} + 2 \log_e S \text{ abhenrys/cm.}$$

1st term = inductance due to internal flux.

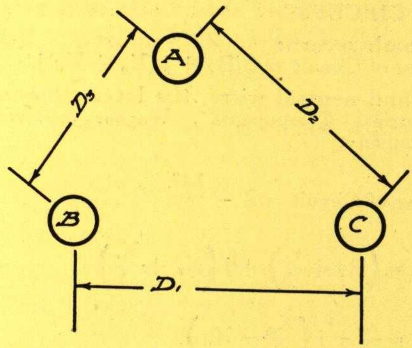
2nd term = inductance due to flux between conductor and a radius of 1 ft.

3rd term = inductance due to external flux between a radius of 1 ft. and centre of other conductor.

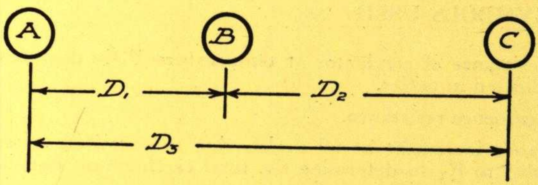
"Partial Inductive Reactance" = sum of 1st and 2nd terms.

"Inductive Spacing Correction Factor" = 3rd term.

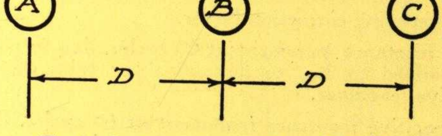
For properly transposed unsymmetrically spaced three phase lines the effect of irregularity may be taken into consideration by the introduction of equivalent spacings. The equivalent spacing formulae for the most usual configurations are as follows:



Equivalent spacing $= D_e = \sqrt[3]{D_1 \cdot D_2 \cdot D_3}$



Equivalent spacing $= D_e = \sqrt[3]{D_1 \cdot D_2 \cdot D_3}$



Equivalent spacing $= D_e = 1.26\ D$

The principal formulae used in calculations by the method of symmetrical components are as follows:

THREE PHASE CIRCUIT

Series Resistance and Inductive Reactance

Positive- and Negative-Sequence Impedance:

$Z_1 = Z_2 = R_T + j\ (X_a + X_d)$ **ohms per phase per mile.**

Zero-Sequence Impedance:

$Z_o = (R_T + r_e) + j\ (X_a + X_e - 2X_d)$ **ohms per phase per mile.**

Shunt Capacitive Reactance

Positive- and Negative-Sequence Impedance:

$Z_1 = Z_2 = X_a' + X_d'$ **megohms per phase per mile.**

Zero-Sequence Impedance:

$Z_o = X_a' + X_e' - 2X_d'$ **megohms per phase per mile.**

SINGLE PHASE CIRCUIT

(a) **Without earth return:**

Impedance of Circuit $= 2\,[R_T + j\,(X_a + X_d)]$.

(b) **With line and neutral wires, the latter thoroughly grounded.** ("Symmetrical Components", Wagner & Evans, McGraw-Hill Book Company.)

$$\text{Impedance of Circuit} = Z - \frac{M^2}{Z}.$$

$$\text{Where } Z = \left(R_T + \frac{r_e}{3}\right) + j\left(X_a + \frac{X_e}{3}\right)$$

$$\text{and} \quad M = \frac{r_e}{3} + j\left(\frac{X_e}{3} - X_d\right).$$

LIST OF SYMBOLS USED

R_T = a.c. resistance of conductor at temperature T (in degrees centigrade) indicated in tables.

R'_T = zero-sequence resistance.

r_e = resistance increment at 60 cycles, due to resistivity of earth, to be added to R_T to determine the total earth return circuit resistance.

X_a = partial inductive reactance.

X_d = inductive spacing correction factor.

X_a' = partial shunt capacitive reactance.

X_d' = capacitive spacing correction factor.

X_e = inductive reactance increment at 60 cycles, due to resistivity of earth to be added to X_a, to determine the total earth return circuit inductive reactance.

X_e' = shunt capacitive reactance increment at 60 cycles, due to resistivity of earth to be added to X_a' to determine the total earth return circuit shunt capacitive reactance.

X_L = total positive or negative sequence inductive reactance.

X_{LO} = total zero-sequence inductive reactance.

X_c = total positive or negative sequence shunt capacitive reactance.

X_{co} = total zero-sequence shunt capacitive reactance.

Z_1 = positive-sequence impedance.

Z_2 = negative-sequence impedance.

Z_o = zero-sequence impedance.

The resistance of conductor at any temperature t (in degrees centigrade) other than that indicated in tables may be computed from the following formula:

$$R_t = \left(\frac{234.5 + t}{234.5 + T}\right) R_T$$

Courtesy "Westinghouse"

CHARACTERISTICS OF THREE CONDUCTOR PAPER INSULATED, LEAD SHEATHED CABLES

Grounded Neutral—4,000 Volts

	Positive- and Negative-Sequence			Zero-Sequence		
Cond. Size B. & S. or C.M.	R_T † Resistance Ohms/1,000′ @ 60°C.	X_L Inductive Reactance Ohms/1,000′ per Phase @ 60 Cycles	X_C ‡ Shunt Capacitive Reactance Ohms/1,000′ per Phase @ 60 Cycles	R'_T** Resistance Ohms/1,000′ per Phase @ 60°C.	X_{LO} Inductive Reactance Ohms/1,000′ per Phase @ 60 Cycles	X_{CO} ‡ Shunt Capacitive Reactance Ohms/1,000′ per Phase @ 60 Cycles
*6	.475	.0396	43,800	1.856	.0587	74,000
*4	.300	.0372	38,200	1.431	.0550	66,000
2	.188	.0319	26,900	1.313	.0482	48,300
1	.150	.0302	23,800	1.197	.0464	42,800
1/0	.118	.0292	21,900	1.108	.0447	39,600
2/0	.094	.0285	18,800	0.940	.0433	34,800
3/0	.075	.0275	17,000	.870	.0417	31,000
4/0	.059	.0268	14,400	.790	.0398	27,700
250,000	.050	.0262	13,500	.695	.0386	25,800
300,000	.042	.0256	12,300	.651	.0375	23,600
350,000	.036	.0251	11,400	.615	.0366	22,800
400,000	.031	.0248	11,000	.541	.0358	21,100
500,000	.025	.0238	9,860	.499	.0355	19,500

Grounded Neutral—8,000 Volts

*6	.475	.0414	46,300	1.606	.0625	83,000
*4	.300	.0387	40,500	1.335	.0587	75,000
2	.188	.0333	43,700	1.217	.0535	56,400
1	.150	.0314	36,500	1.113	.0500	51,700
1/0	.118	.0304	30,800	0.958	.0479	47,400
2/0	.094	.0296	25,500	.883	.0461	42,700
3/0	.075	.0286	20,200	.816	.0439	38,600
4/0	.059	.0278	14,900	.698	.0428	34,700
250,000	.050	.0269	12,000	.656	.0414	31,400
300,000	.042	.0263	8,600	.615	.0398	29,600
350,000	.036	.0258	6,370	.546	.0392	27,200
400,000	.031	.0256	3,970	.520	.0378	25,500
500,000	.025	.0248	2,980	.481	.0371	23,400

* Round Conductors, remainder sector shaped.

† A.C. resistance based on International Annealed Copper Standard of resistivity, plus 2% for stranding and 2% for cabling.

‡ Based on dielectric constant of insulation = 3.7.

** Based on all return current in sheath.

CHARACTERISTICS OF THREE CONDUCTOR PAPER INSULATED, LEAD SHEATHED CABLES

Ungrounded Neutral—10,000 Volts

	Positive- and Negative-Sequence			Zero-Sequence		
Cond. Size B. & S. or C.M.	R_T † Resistance Ohms/1,000′ @ 60°C.	X_L Inductive Reactance Ohms/1,000′ per Phase @60Cycles	X_C ‡ Shunt Capacitive Reactance Ohms/1,000′ per Phase @60Cycles	R'_T** Resistance Ohms/1,000′ per Phase @ 60°C.	X_{LO} Inductive Reactance Ohms/1,000′ per Phase @60Cycles	X_{CO} ‡ Shunt Capacitive Reactance Ohms/1,000′ per Phase @60Cycles
*6	.475	.0430	52,400	1.441	.0701	99,000
*4	.300	.0402	46,300	1.122	.0656	90,600
2	.188	.0344	58,800	1.010	.0611	72,800
1	.150	.0328	51,800	0.930	.0665	67,000
1/0	.118	.0315	46,300	.862	.0541	62,200
2/0	.094	.0306	40,200	.733	.0525	58,000
3/0	.075	.0294	34,800	.696	.0503	53,000
4/0	.059	.0287	28,800	.626	.0479	47,900
250,000	.050	.0278	24,600	.569	.0465	44,500
300,000	.042	.0272	22,000	.534	.0447	42,200
350,000	.036	.0265	18,800	.507	.0439	39,200
400,000	.031	.0264	14,800	.484	.0422	36,200
500,000	.025	.0254	11,300	.412	.0417	32,600

Ungrounded Neutral—15,000 Volts

*6	.475	.0460	58,600	1.276	.0725	107,700
*4	.300	.0429	52,000	1.053	.0681	99,000
*2	.188	.0399	45,900	0.806	.0644	89,800
*1	.150	.0375	42,500	.741	.0605	85,200
1/0	.118	.0334	57,100	.730	.0584	71,500
2/0	.094	.0326	50,800	.679	.0557	66,000
3/0	.075	.0313	45,000	.630	.0532	61,500
4/0	.059	.0303	39,100	.548	.0512	56,400
250,000	.050	.0300	35,900	.524	.0493	53,400
300,000	.042	.0286	30,900	.498	.0476	49,500
350,000	.036	.0280	28,300	.438	.0467	47,400
400,000	.031	.0276	24,500	.418	.0455	44,200
500,000	.025	.0266	20,400	.364	.0442	40,200

* Round Conductors, remainder sector shaped.

† A.C. resistance based on International Annealed Copper Standard of resistivity, plus 2% for stranding and 2% for cabling.

‡ Based on dielectric constant of insulation = 3.7.

** Based on all return current in sheath.

CHARACTERISTICS OF COPPER TRANSMISSION LINE CONDUCTORS

Hard Drawn 97.3 Per Cent. Conductivity

Size of Conductor: Circular Mils	Size of Conductor: B. & S.	Number of Wires	Outside Diameter, Inches	Approx.* Max. Current Carrying Capacity	Xa′ Partial Shunt Capacitive React. Megohms/mile/phase	RT Resistance Ohms/mile @ 50°C.	Xa Partial Inductive Reactance Ohms/mile/phase
1,000,000	....	61	1.152	1,300	.0901	.0672	.400
900,000	....	61	1.093	1,220	.0916	.0748	.406
800,000	....	61	1.031	1,130	.0934	.0840	.413
750,000	....	61	0.998	1,090	.0943	.0897	.417
700,000	....	61	.964	1,040	.0954	.0957	.421
600,000	....	37	.891	945	.0977	.111	.432
500,000	....	37	.813	842	.100	.132	.443
400,000	....	19	.726	730	.104	.164	.458
300,000	....	19	.630	607	.108	.217	.476
250,000	....	19	.574	540	.111	.262	.487
211,600	0000	19	.528	485	.113	.307	.497
211,600	0000	7	.522	484	.113	.307	.504
167,806	000	7	.464	416	.117	.387	.518
133,077	00	7	.414	359	.120	.487	.532
105,535	0	7	.368	309	.124	.614	.546
83,693	1	7	.328	266	.127	.774	.560
66,371	2	7	.292	230	.131	.975	.574
66,371	2	3	.320	235	.128	.965	.571
52,635	3	7	.260	198	.134	1.22	.588
52,635	3	3	.285	202	.131	1.22	.585
41,740	4	3	.254	172	.135	1.54	.599
41,740	4	1	.204	166	.142	1.52	.609
33,100	5	3	.226	150	.138	1.94	.613
33,100	5	1	.182	143	.145	1.92	.622
26,250	6	3	.201	130	.142	2.44	.628
26,250	6	1	.162	123	.148	2.42	.637
20,820	7	1	.144	106	.152	3.05	.651
16,510	8	1	.129	92	.153	3.84	.665

* Based on a Conductor Temperature of 75°C and an Ambient of 25°C.

CHARACTERISTICS OF ALUMINUM CABLE STEEL REINFORCED CONDUCTORS

Size of Conductor, Cir. Mils. or B. & S.	Number of Wires Aluminum	Number of Wires Steel	Copper* Equiv., Cir. Mils. or B. & S.	Outside Diameter, Inches	Approx.‡ Max. Current Carrying Capacity	Xa′ Partial Shunt Capacitive React. Megohms/mile/phase	Rt Resistance Ohms/mile @ 50°C.	Xa Partial Inductive Reactance Ohms/mile/phase
954,000	54	7	600,000	1.196	1,010	.0890	.109	.390
900,000	54	7	566,000	1.162	966	.0898	.115	.393
874,500	54	7	550,000	1.146	949	.0903	.119	.395
795,000	54	7	500,000	1.093	897	.0917	.131	.401
795,000	26	7	500,000	1.108	901	.0912	.131	.399
795,000	30	19	500,000	1.140	909	.0904	.131	.393
715,500	54	7	450,000	1.036	834	.0932	.145	.407
715,500	26	7	450,000	1.051	838	.0928	.145	.405
715,500	30	19	450,000	1.081	845	.0920	.145	.399
666,600	54	7	419,000	1.000	800	.0943	.155	.412
636,000	54	7	400,000	0.977	774	.0950	.163	.414
636,000	26	7	400,000	0.990	777	.0946	.163	.412
636,000	30	19	400,000	1.019	781	.0937	.163	.406
605,000	54	7	380,500	0.953	748	.0957	.172	.417
556,500	26	7	350,000	.927	734	.0965	.186	.420
556,500	30	7	350,000	.953	726	.0957	.186	.415
500,000	30	7	314,500	.904	692	.0973	.207	.421
477,000	26	7	300,000	.858	666	.0988	.217	.430
477,000	30	7	300,000	.883	671	.0980	.218	.424
397,500	26	7	250,000	.783	591	.102	.260	.441
397,500	30	7	250,000	.806	596	.101	.261	.435
336,400	26	7	0000	.721	530	.104	.309	.451
336,400	30	7	0000	.741	535	.103	.309	.445
300,000	26	7	188,700	.680	493	.106	.345	.458
300,000	30	7	188,700	.700	497	.105	.345	.452
266,800	26	7	000	.642	457	.107	.388	.465
0000	6	1	00	.563	340	.111	.485	.581
000	6	1	0	.502	303	.115	.610	.621
00	6	1	1	.447	266	.118	.771	.641
0	6	1	2	.398	233	.122	.972	.656
1	6	1	3	.355	199	.125	1.23	.665
2	6	1	4	.316	179	.128	1.55	.665
3	6	1	5	.281	157	.132	1.95	.661
4	6	1	6	.250	137	.135	2.46	.659
5	6	1	7	.223	118	.139	3.10	.665
6	6	1	8	.198	102	.142	3.91	.673

* Based upon Copper 97%; Aluminum 61%.

‡ Based upon a Conductor Temperature of 75°C. and an Ambient of 25°C.

CHARACTERISTICS OF COPPERWELD AND COMPOSITE COPPER-COPPERWELD CONDUCTORS

Size of Conductor or Designation	Number of Wires: Copper	Number of Wires: Copperweld	Hard Drawn Copper Equivalent in Cir. Mils.	Outside Diameter, Inches	Approx.* Max. Current Carrying Capacity	Rt Resistance Ohms/mile @ 50°C.	Xa Partial Inductive Reactance Ohms/mile/phase
Copperweld—30% Conductivity—H. S. and E. H. S.							
3 No. 8	..	3	15,150	.277	131	4.24	.723
3 No. 9	..	3	12,010	.247	113	5.35	.735
3 No. 10	..	3	9,528	.220	98	6.75	.750
6	..	1	8,030	.162	87	7.95	.758
8	..	1	5,049	.128	65	12.61	.786
Copperweld—40% Conductivity—H. S.							
3 No. 8	..	3	20,200	.277	151	3.18	.723
3 No. 9	..	3	16,020	.247	130	4.00	.735
3 No. 10	..	3	12,700	.220	113	5.06	.750
6	..	1	10,700	.162	101	5.95	.758
8	..	1	6,732	.128	75	9.47	.786
Composite Copper-Copperweld							
2A	2	1	66,370	.366	231	.970	.639
3A	2	1	52,630	.326	199	1.23	.655
4A	2	1	41,740	.290	171	1.55	.671
5A	2	1	33,100	.258	148	1.95	.681
6A	2	1	26,250	.230	126	2.46	.697
7A	2	1	20,820	.223	111	3.15	.702
8A	2	1	16,510	.199	96	3.97	.713

* Based on a Conductor Temperature of 125°C. for Copperweld and 75°C. for Composite Copper-Copperweld.

INDUCTIVE REACTANCE SPACING CORRECTION FACTORS

X_d—Ohms per Mile per Phase
Separation—Feet

Feet	0	1	2	3	4	5	6	7	8	9
0	....	0	.084	.133	.168	.195	.217	.236	.252	.267
10	.279	.291	.302	.311	.320	.329	.336	.344	.351	.357
20	.364	.369	.375	.380	.386	.391	.395	.400	.404	.409
30	.413	.417	.421	.424	.428	.431	.435	.438	.441	.445

X_d—Ohms per Mile per Phase
Separation—Inches (see Footnote †)

Inches	0	1	2	3	4	5	6	7	8	9
0	....	$\overline{.302}$	$\overline{.217}$	$\overline{.169}$	$\overline{.134}$	$\overline{.107}$	$\overline{.085}$	$\overline{.066}$	$\overline{.050}$	$\overline{.035}$
10	$\overline{.023}$	$\overline{.011}$	0	.010	.019	.027	.035	.042	.049	.056
20	.062	.068	.074	.079	.084	.089	.094	.098	.103	.107
30	.111	.115	.119	.123	.126	.130	.133	.137	.140	.143
40	.146	.149	.152	.155	.158	.160	.163	.166	.168	.171
50	.173	.176	.178	.180	.183	.185	.187	.189	.191	.193
60	.195	.197	.199	.201	.203	.205	.207	.209	.211	.212

For Computing Zero-Sequence Impedance Only
r_e = Resistance = .286 Ohms per Mile per Phase.
x_e = Reactance, from Table Below.

X_e—Ohms per Mile per Phase

ϱ' Earth Resistivity Meter-Ohms	1	5	10	50	100	500	1,000	5,000	10,000
X_e	2.05	2.35	2.47	2.77	2.89	3.19	3.31	3.61	3.73

† Bar Over Number Indicates Negative Value.

CAPACITIVE REACTANCE SPACING CORRECTION FACTORS

X_d'—Megohms per Mile per Phase
Separation—Feet

Ft.	0	1	2	3	4	5	6	7	8	9
0	.....	0	.0206	.0326	.0411	.0478	.0532	.0577	.0617	.0652
10	.0683	.0711	.0737	.0761	.0783	.0804	.0823	.0841	.0858	.0874
20	.0889	.0903	.0917	.0930	.0943	.0955	.0967	.0978	.0989	.0999
30	.101	.102	.103	.104	.105	.106	.106	.107	.108	.109

X_d'—Megohms per Mile per Phase
Separation—Inches (see Footnote †)

In.	0	1	2	3	4	5	6	7	8	9
0	.....	$\overline{.0737}$	$\overline{.0532}$	$\overline{.0411}$	$\overline{.0326}$	$\overline{.0260}$	$\overline{.0206}$	$\overline{.0160}$	$\overline{.0120}$	$\overline{.009}$
10	$\overline{.005}$	$\overline{.003}$	0	.0023	.0045	.0066	.0085	.0103	.0120	.0136
20	.0151	.0166	.0180	.0193	.0206	.0218	.0229	.0240	.0251	.0262
30	.0272	.0281	.0291	.0300	.0309	.0317	.0326	.0334	.0342	.0349
40	.0357	.0364	.0371	.0378	.0385	.0392	.0398	.0405	.0411	.0417
50	.0423	.0429	.0435	.0440	.0446	.0451	.0457	.0462	.0467	.0472
60	.0478	.0482	.0487	.0492	.0496	.0501	.0505	.0510	.0514	.0519

For Computing Zero-Sequence Shunt Capacitive Reactance Only
x_e' = Reactance, from Table Below.

X_e'—Megohms per Mile per Phase
Height Above the Ground—Feet

10	15	20	25	30	40	50	60	70	80	90	100
.267	.303	.328	.348	.364	.390	.410	.426	.440	.452	.462	.472

SPACING CORRECTION FACTORS FOR THREE-PHASE CIRCUIT WITH STANDARD CROSSARM

Type of Arm	Spacing in In.	x_d†	x_d'†
4 Pin * Low Voltage	14½ x 44½ x 59	.125	.0305
6 Pin Low Voltage	14½ x 14½ x 29	.051	.0124
6 Pin (Alley) Low Voltage	14 x 14 x 28	.047	.0113
8 Pin * Low Voltage	13⅝ x 27¼ x 40⅞	.088	.0214
4 Pin * Med. Voltage	36 x 38 x 74	.164	.0401
Secondary Racks	4 x 4 x 8	$\overline{.105}$	$\overline{.0258}$
	6 x 6 x 12	$\overline{.057}$	$\overline{.0138}$
	8 x 8 x 16	$\overline{.022}$	$\overline{.0053}$

* Neutral or Ground Wire Located on Intermediate Pin.
† Bar Over Number Indicates Negative Value.

APPLICATION OF 60 CYCLE IMPEDANCE CHARACTERISTICS TO TRANSMISSION AND DISTRIBUTION CIRCUITS

Example No. 1

A three phase circuit consisting of a 3-conductor 300,000 C.M. sector, P.I.L.C. 15,000-volt cable, ungrounded neutral, delivers a load of 4,560 Kw. at 13,200 volts, 60 cycles, 80% power factor, a distance of 2,000 feet.

Determine the line voltage drop, regulation, copper loss, and charging current.

From the tables on page 242 for Positive-Sequence,

R_T = 0.042 ohms per 1,000 feet per phase at 60°C.

X_L = total inductive reactance = 0.0286 ohms per 1,000 feet per phase at 60 Cycles.

Hence Positive-Sequence impedance, Z_1

$= 0.042 + j\,0.0286$ per 1,000 feet per phase.

For 2,000 ft. length,

$Z_1 = 0.084 + j\,0.0572$ per phase

$$I = \text{line current} = \frac{4{,}560 \times 1{,}000}{1.73 \times 13{,}200 \times .80} = 250 \text{ amperes}$$

E_R = receiving end volts to neutral

$$= \frac{13{,}200}{1.73} = 7{,}630 \text{ volts}$$

$IZ_1 = 250\,(0.084 + j\,0.0572)$ per phase
$= 21 + j\,14.3$ per phase

E_S = sending end volts to neutral
= sum of vectors E_R and IZ_1
$= E_R \cos\theta + j\,E_R \sin\theta + 21 + j\,14.3$

$\cos\theta = 0.80$

$\sin\theta = \sqrt{1 - (0.80)^2} = 0.60$

$E_R \cos\theta = 7{,}630 \times 0.80 = 6{,}100$ volts
$E_R \sin\theta = 7{,}630 \times 0.60 = 4{,}575$ volts.

$$\text{Absolute value of } E_S = \sqrt{(E_R\cos\theta + 21)^2 + (E_R\sin\theta + 14.3)^2}$$
$$= \sqrt{(6{,}100 + 21)^2 + (4{,}575 + 14.3)^2}$$
$$= \sqrt{6{,}121^2 + 4{,}589.3^2}$$
$$= 7{,}650 \text{ volts.}$$

Voltage between lines at sending end

$= 1.73 \times 7{,}650$
$= 13{,}234.5$ volts.

Total line drop $= 13{,}234.5 - 13{,}200$
$= 34.5$ volts.

Regulation $= \dfrac{13{,}234.5 - 13{,}200}{13{,}200}$
$= 0.261$ per cent.

Note: In the above example, the conductor size was obviously determined by the current carrying capacity.

Copper Loss $= 3 \times I^2 (2R_T)$ watts
$= 3 \times 250 \times 250 \times 2 \times .042$
$= 15{,}730$ watts
$= 15.7$ Kw.

Charging Current:

From the table on page 242 for Positive-Sequence.

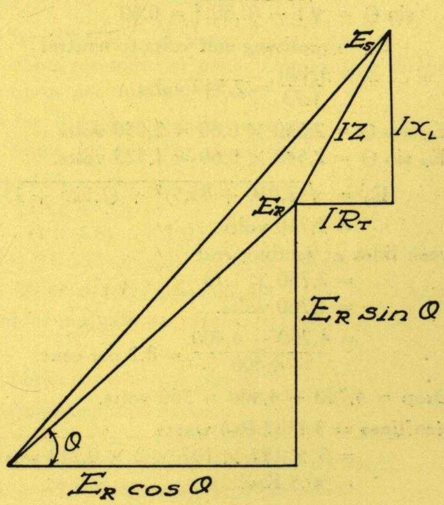
Shunt Capacitive Reactance $= X_c = 30{,}900$ ohms per 1,000 ft.

$$\text{Charging current} = 2 \times \frac{13{,}200}{1.73} \times \frac{1}{30{,}900}$$
$= 0.496$ amperes.

Example No. 2

A three phase transmission line two miles long delivers a load of 1,200 Kw. at 4,400 volts, 60 cycles, to a load circuit of 80% power factor. The conductors are 300,000 C.M. (19 wire) copper cable properly transposed and spaced twenty-four inches apart in a symmetrical flat spacing.

Determine total line drop and regulation at operating temperature of 50°C.



From page 243 for 300,000 C.M. (19 wire) copper conductor,

R_T = 0.217 ohms per mile per phase at 50°C.

X_a = partial inductive reactance = 0.476 ohms per mile per phase at 60 cycles.

From page 239 for symmetrical flat spacing,

$$D_e = 1.26\,D = 1.26 \times 24 = 30.2 \text{ inches.}$$

From page 246 for 30 inch equivalent spacing,

X_d = inductive spacing correction factor
= 0.111 ohms per mile per phase at 60 cycles.

Hence Positive-Sequence impedance per mile per phase,

$$Z_1 = R_T + j\,(X_a + X_d) = 0.217 + j\,(0.476 + 0.111) = 0.217 + j\,0.587$$

Length of line = 2 miles.

Therefore for whole line $Z_1 = 0.434 + j\,1.174$

$$I = \text{line current} = \frac{1{,}200{,}000}{1.73 \times 0.80} = 197 \text{ amperes}$$

$$IZ_1 = 197\,(0.434 + j\,1.174) = 85.5 + j\,232.$$

Hence E_S = sending end volts to neutral
= sum of vectors E_S and IZ_1

$$= E_R \cos\theta + j\,E_R \sin\theta + 85.5 + j\,232$$
$$= (E_R \cos\theta + 85.5) + j\,(E_R \sin\theta + 232)$$

Therefore absolute value of E_S

$$= \sqrt{(E_R \cos\theta + 85.5)^2 + (E_R \sin\theta + 232)^2}$$

$$\cos\theta = 0.80$$

$$\sin\theta = \sqrt{1 - (0.80)^2} = 0.60$$

E_R = receiving end volts to neutral

$$= \frac{4{,}400}{1.73} = 2{,}540 \text{ volts}$$

$$E_R \cos\theta = 2{,}540 \times 0.80 = 2{,}030 \text{ volts}$$
$$E_R \sin\theta = 2{,}540 \times 0.60 = 1{,}525 \text{ volts.}$$

Therefore $E_S = \sqrt{(2{,}030 + 85.5)^2 + (1{,}525 + 232)^2}$
= 2,750 volts.

Voltage between lines at sending end
= 2,750 × 1.73
= 4,760 volts.

$$\text{Regulation} = \frac{4{,}760 - 4{,}400}{4{,}400} = 8.2 \text{ per cent.}$$

Total Line Drop = 4,760 − 4,400 = 360 volts.

Copper loss in Lines = $3\,I^2\,(2\,R_T)$ watts
= 3 × 197 × 197 × 2 × 0.217 watts
= 50.5 Kw.

Example No. 3

Determine the total line drop and regulation for above line properly transposed and unsymmetrically spaced in a flat spacing with the conductors 1 and 2 spaced 2 feet apart, and conductors 2 and 3 spaced 3 feet apart.

From page 239 for unsymmetrical flat spacing,

$$D_e = \sqrt[3]{2 \times 3 \times 5}$$
$$= 3.1 \text{ feet}$$
$$= 37 \text{ inches.}$$

From page 246 for 37 inch equivalent spacing,

$$X_d = 0.137.$$

Therefore $X_a + X_d = 0.476 + 0.137 = 0.613$

$$IZ_1 = 197\ (0.434 + j\ 1.226)$$
$$= 85.5 + j\ 242$$

Therefore $E_S = \sqrt{(2030 + 85.5)^2 + (1{,}525 + 242)^2}$

$$= 2{,}760 \text{ volts.}$$

Voltage between lines at sending end

$$= 2{,}760 \times 1.73$$
$$= 4{,}780 \text{ volts.}$$

Total Line Drop = 380 volts.
Regulation = 8.65 per cent.

Example No. 4

Determine the positive- and zero-sequence impedances of the transmission line in Example No. 2 assuming the average earth resistivity $\varrho' = 100$ meter-ohms.

From page 243 for 300,000 C.M. copper conductor,

$R_T = 0.217$ ohms per mile per phase at operating temperature of 50°C.
$X_a = 0.476$ ohms per mile per phase.

From page 246 for 30 inch equivalent spacing,

$X_d = 0.111$ ohms per mile per phase.

Therefore Positive-Sequence impedance,

$$Z_1 = R_T + j\ (X_a + X_d)$$
$$= 0.217 + j\ (0.476 + 0.111)$$
$$= 0.217 + j\ 0.587 \text{ ohms per mile per phase.}$$

From page 246 for $\varrho' = 100$ meter-ohms,

$X_e = 2.89$ ohms per mile per phase.

From page 246,

$r_e = 0.286$ ohms per mile per phase.

Therefore Zero-Sequence impedance,

$$Z_o = R_T + r_e + j\ (X_a + X_e - 2\ X_d)$$
$$= 0.217 + 0.286 + j\ [0.476 + 2.89 - 2(0.111)]$$
$$= 0.503 + j\ 3.144 \text{ ohms per mile per phase.}$$

SYMBOLS

A = size of conductor, circular mils.
D = outside diameter of sheath, inches.
D_i = inside diameter of lead sheath, inches.
d = conductor diameter, (round), inches.
E = voltage between conductors, Kilovolts.
e = voltage to neutral, Kilovolts.
f = frequency.
G = geometric factor for a single conductor cable.
G_1 = geometric factor all conductors against sheath.
G_2 = geometric factor for three phase operation (belted cable).
G_x = any geometric factor, depending on the connection desired.
H = heating constant of the duct in thermal ohms for one foot. Standard duct heating constants, based on N.E.L.A. studies, and representative of average field conditions are as follows:

Number of Equally Loaded Cables in Outside Ducts (N) .	1	2	3	4	5	6	7	8	9	10	11	12
Heating Constant (H) in Thermal Ohms for one foot of duct....	1.45	1.15	1.04	.93	.86	.82	.79	.77	.75	.74	.73	.72

K = conventional minimum constants for insulation resistance at 15.5°C. (60°F.).

Paper (oil-filled)	3,000
Paper (compound-filled)	500
Varnished Cambric	500
Rubber (Code)	720
Rubber (Intermediate)	1,500
Rubber (30% grades)	4,000

k = specific inductive capacity of insulating material.
Representative values:

Paper (oil-filled)	3.7
Paper (compound-filled)	4.0
Varnished Cambric	5.0
Rubber	2.9 to 7.0

L_f = loss factor, expressed as ratio.
n = number of conductors in cable, or percentage conductivity, expressed as a decimal.
R = conductor resistance at temperature T_o, ohms per 1,000 ft. from equation (8).
R_{ac}/R_{dc} = ratio of alternating current resistance to direct current resistance of conductor.

This ratio is a combination of the skin effect ratio, as given in the table on page 263, and the proximity effect which, in multiple conductor cables, must be taken into account. For many types of stranded sector conductor the combined skin-proximity effect may be taken as 1.35 times the skin effect. For Canada Wire & Cable Co. sector cables, however, the proximity effect is practically eliminated and the combined effect may therefore be taken as equal to the skin effect only.

R_o = added effective conductor resistance due to induced sheath currents, ohms per 1,000 feet, from equations 12, or 13.

R_S = resistance of lead sheath, ohms per 1,000 feet.

R_T = conductor resistance at temperature T deg. C., ohms per 1,000 feet.

R_{th} = thermal resistance to I^2R loss between conductors and base in thermal ohms per one foot of cable from equation 34, 35 or 36.

R'_{th} = thermal resistance to dielectric loss between conductors and base in thermal ohms per foot of cable. For single conductor and three conductor Type H cables from equations 34 and 35 respectively, except that the first term should be divided by 2, and the loss factor L_f should be omitted from the last term. For multi-conductor belted cables from equation 36, except that the loss factor L_f should be omitted from the last term.

R_{25} = conductor resistance at 25°C., ohms per 1,000 feet.

r = radius of conductor, inches.

r_m = mean radius of sheath $(r_5 + r_4) \div 2$, inches.

r_4 = inner radius of lead sheath, inches.

r_5 = outer radius of lead sheath, inches.

S = distance between centres of conductors, inches.

S_1 = distance between effective current centre of each conductor and the cable centre, inches.

T = conductor insulation thickness, inches, or temperature, deg. C.

T_G = base temperature of earth, deg. C. If cable operates in air, use ambient temperature of air, deg. C.

T_o = allowable temperature of insulation, deg. C.

t = belt thickness, inches, or new temperature deg. C.

W_{DL} = dielectric loss in watts per foot of cable from equation 27, 28 or 29.

X_M = $2\pi fM$ in which M is mutual inductance of conductor and sheath.

ϱ_1 = electrical resistivity of insulation at a given temperature in megohm-cm., units.

$\cos \phi$ = power factor of the insulation for a given temperature and frequency, expressed as a decimal.

CURRENT CARRYING CAPACITY

One of the most common problems of cable calculation is the allowable current as limited by temperature rise. A word of caution, however, might be added. Current carrying capacity may be limited in general by the question of regulation, efficiency, economy, temperature rise, stability, etc. The actual limitation in a particular case is determined by the consideration which indicates the smallest permissible current. A given problem cannot be considered to have been solved completely unless it has been investigated from all these angles. For low voltage mains and feeders, the usual controlling factor is voltage drop and regulation. For higher voltage cables, in spite of notable exceptions, there seems to have sprung up a general idea that the limit is always a question of temperature rise. This is by no means the general case.

An obvious exception would be a long submarine cable, where regulation instead of temperature might be the criterion.

There are many other cases, moreover, of underground cables in ducts, where the laws of economy should be given more attention than they have in certain cases. The problem is such a large one that it cannot be covered in this outline, but it is obvious that in many cases, especially in a system where a consumer purchases power and has a high load-factor, it would cost less per year to use a relatively large size of conductor than to use smaller conductors and have a large annual charge for the losses. Some cases are quite clean-cut in this respect, but in each instance the matter should be considered. Whenever there is any doubt as to the relative economy in the use of different sizes of the conductor, the final decision in the matter should be obtained only by considering the actual costs of the possible sizes that might be considered. Finally, it should be noted that not uncommonly a circuit is intended for a given current and in the future it becomes desirable considerably to increase this current. If economic considerations should dictate a size greater than necessary by reason of temperature limitations, its future increase in capacity is practical.

Before considering in detail the essential steps involved in the calculation of current carrying capacity, attention is directed to the loading tables which are given on pages 264 to 293. These tables give the maximum permissible carrying capacity of various groups and types of cables based upon a definitely stated set of representative assumptions. Where actual conditions conform to these, the tables will give the answer to a degree of accuracy well within the limits of practical requirements without further calculation.

Confining the problem to the calculation of current carrying capacity as limited by temperature rise, the problem is simple in its essentials, though it becomes somewhat complicated in certain cases. The fundamental requirement is that the insulation of the cable should not be heated above a certain temperature. Heat is generated in the conductors as I^2R loss, in the sheath by induced currents and, to a much less degree, in the insulation itself by the voltage stresses, or, in other words,

the dielectric loss. The heat from these three sources must flow outward through the thermal resistance of the various elements, causing a total temperature rise. This temperature rise when added to the base temperature of the soil must not result in a conductor temperature greater than the allowable insulation temperature. That is the problem in a nutshell.

The fundamental law that should be borne in mind has been called "Ohm's law for heat," which is directly analogous to Ohm's law for electric circuits. In the electrical case, the difference of electrical potential is equal to the product of the electrical resistance by the electric current flowing. The corresponding thermal law is that the difference of temperature is equal to the product of the thermal resistance by the heat flow. Expressed mathematically in the proper units, temperature rise in deg. C. equals thermal ohms times watts. For the case of a cable, the heat is radial and follows an infinite number of parallel paths. Attention must therefore be confined to certain elements. Inasmuch as both the losses and the thermal conductance are proportional to the length of cable, merely one foot of cable need be considered.

THERMAL RESISTANCE (a) Cables in Ducts

Single Conductor Compound-Filled Paper* Insulated Lead Sheathed Cable:

$$R_{th} = 3.65\,G + \frac{4.93\dagger}{D} + L_f\,N\,H \text{ thermal ohms for one foot of cable} \quad (34)$$

Three Conductor Compound-Filled Type H Paper* Insulated Lead Sheathed Cable:

$$R_{th} = \frac{3.65\,G_1}{3} + \frac{4.93\dagger}{D} + L_f\,N\,H \text{ thermal ohms for one foot of cable} \quad (35)$$

Multi-Conductor Belted Paper* Insulated Lead Sheathed Cable:

$$R_{th} = \frac{3.65\,G_1}{n} + \frac{4.93\dagger}{D} + L_f\,N\,H \text{ thermal ohms for one foot of cable} \quad (36)$$

(b) Cables in Air

Use formulae (34), (35) and (36) omitting last term.

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* The coefficient 3.65 in equations (34), (35) and (36) is for compound-filled type paper insulation; for oil-filled paper the coefficient becomes 2.87; for varnished cambric, 3.13; and for rubber, 2.61.

† Where the outside diameter, D, of the sheath is less than 1.75 inches the expression $\left(1.29 + \frac{2.67}{D}\right)$ should be used in place of the second term $\frac{4.93}{D}$ in equations (34) to (36). These expressions are based on a surface resistivity of 1200°C./watt/cm^2 for diameters of 1.75 inches and above and on a straight line decrease in resistivity from this point to a value of 650°C./watt/cm^2 at zero diameter.

CURRENT CARRYING CAPACITY

$$I = 0.281\sqrt{\frac{A(T_O - T_G)}{n\,R_{th}}} \text{ amperes per conductor} \quad \ldots\ldots\ldots \quad (37)$$

Note: This is the fundamental formula for current carrying capacity, in its simplest form. It neglects skin and proximity effect, lead sheath loss, and dielectric loss, and assumes that the conductor temperature is 65°C. (an average value of maximum permissible operating temperatures). The method of taking these factors into account is explained below:

Correction for Conductor Temperature:

Multiply current carrying capacity as obtained from equation (37) by

$$\sqrt{\frac{299}{234 + T_o}}$$

Correction for Skin and Proximity Effect:

Multiply current carrying capacity as obtained above by

$$\frac{1}{\sqrt{R_{ac}/R_{dc}}}$$

Correction for Sheath Loss:

Multiply the second and third terms of the expression for R_{th} in equation (34), (35) or (36) by $\frac{R + R_O}{R}$ and use this modified R_{th} in equations (37) or (38).

Complete Formula including Correction for Dielectric Loss:

$$I = \frac{0.281}{\sqrt{R_{ac}/R_{dc}}}\sqrt{\frac{299}{234 + T_O}}\sqrt{\frac{A\,(T_O - T_G - W_{DL}\,R'_{th})}{n\,R_{th}}} \text{ amperes per conductor} \quad \ldots\ldots\ldots \quad (38)$$

CURRENT CARRYING CAPACITY TABLES

The current carrying capacities contained in the tables which follow are based on standard conditions determined by the Underground Systems Committee of the former National Electric Light Association and adopted by the Insulated Power Cable Engineers Association of the U.S.A. The ratings for compound-filled type paper insulated cables have been taken from Publication No. A 14 (July, 1933) of the Edison Electric Institute of the U.S.A.; those for varnished cambric insulated cables were prepared by the I.P.C.E.A. and adopted November 1, 1934. The basis for all of these tables is outlined below:

(a) Thermal resistivity of compound-filled paper insulation, 700 (watt-cm. units); of varnished cambric and oil-filled paper insulation, 600; and of rubber insulation, 500.

(b) Emissivity of sheath, 1,200 (watt-cm. units).

(c) Daily load factors of 50%, 75% and 100% corresponding to loss factors of 33%, 62.5% and 100% for cables in underground ducts, and any load factor from 50% to 100% for cables in air.

(d) Duct constants as follows:

3 cables: 1.04 thermal ohms
6 cables: 0.82 thermal ohms
9 cables: .75 thermal ohms
12 cables: .72 thermal ohms

These constants, when multiplied by the number of loaded cables and the loss factor, give the following values for thermal resistance of ducts, in thermal ohms per foot of duct.

Number of Cables in Duct Bank	Load Factor:	50%	75%	100%
	Loss Factor:	33%	62.5%	100%
3	....	1.03	1.95	3.12
6	....	1.62	3.08	4.92
9	....	2.23	4.22	6.75
12	....	2.85	5.40	8.64

(e) All cables in group of similar size, equally loaded, and in outside ducts only.

(f) Average soil conditions (not dry or "hot spot" conditions).

(g) Groups of cables in ducts are referred to ambient earth temperature without external source of heat.

(h) Groups of cables in air are referred to surrounding air temperature at full load.

(i) C.E.S.A. proposed standard temperature rule for compound-filled paper cable, T = (90 − E)°C. where T is maximum allowable copper temperature and E is the voltage rating in kv. The voltage E is taken as the phase to phase voltage for three conductor belted cables, and the voltage to ground for three conductor shielded and single conductor cables. Minimum temperature 60°C.; maximum temperature 85°C.

A.I.E.E. standard temperature rule for standard varnished cambric cable, T = (75 − E)°C.

Maximum allowable copper temperatures for various rubber compounds:

Code and Intermediate (up to 5,000 volts)	50°C.
30% to 60% Grades (up to 8,000 volts)	60°C.
Heat-Resisting (up to 5,000 volts)	75°C.
Gencorone (up to 5,000 volts)	70°C.
Gencorone (over 5,000 volts)	60°C.

(j) Standard insulation thicknesses of paper in accordance with the C.E.S.A. proposed "Standard Specifications for Insulated Power Cable—Paper Insulated Lead Covered Cable", second draft.

For varnished cambric and rubber insulation, standard I.P.C.E.A. thicknesses.

Deviation, within reasonable limits, from these thicknesses in any one voltage class, does not introduce appreciable error in current rating.

(k) Standard logarithmic formula used in calculating thermal resistance of single conductor cables. Thermal resistance of three conductor cables determined by the method given by Dr. D. M. Simmons, "Electric Journal", July, 1932, page 336.

(l) Tables include corrections for dielectric loss and all other forms of extra a-c losses as indicated below.

DIELECTRIC LOSS

Paper

The reduction in carrying capacity of compound-filled paper insulated cables due to dielectric loss, as included in the tables, is based on the following A.E.I.C. maximum dielectric power factor values at 60 cycles.

Temperature in °C.	POWER FACTOR	
	7.5 to 20 kv.	20.1 kv. and over
Room to 60	2.0%	1.2%
70	2.9%	1.7%
75	3.4%	2.0%
80	4.0%	2.4%
85	4.7%	2.9%
90	5.5%	.....

For oil-filled cable, a power factor of 0.5% is assumed. The specific inductive capacity (S.I.C.) of compound-filled insulation is assumed as 3.7 (3.5 for oil-filled) for all temperatures and the calculated dielectric loss is based on uniform temperature for the cable cross section.

Standard Varnished Cambric

The reduction in carrying capacity of varnished cambric insulated cables due to dielectric loss is based on an S.I.C. of 5.5 and on the following maximum dielectric power factor values at 60 cycles, the same assumptions applying as given in the previous paragraph.

Temperature in °C.	POWER FACTOR	
	Single or Multi-Conductor Shielded Cable	Multi-Conductor Non-shielded Cable
Room to 40	7.0%	10.0%
60	10.0%	15.0%
80	16.0%	25.0%

Rubber

In the case of rubber insulated cables the dielectric loss is neglected. This is considered satisfactory because of the comparatively low voltages involved.

ADDITIONAL A-C LOSSES

Single and three conductor cables have extra a-c losses produced by induction, such as skin effect and proximity effect losses in the conductors, loss in the lead sheath, and relatively small losses in the metal shielding and metal binding tape where such tapes are used.

For single conductor cable the tables include skin effect losses (proximity effect losses are negligible). Induced sheath current losses for short-circuited sheath operation are not included (except for one tabulation on oil-filled type) since these vary with spacing between cables. The tables, therefore, are based generally on open-circuited sheath operation of single conductor cable, in which case there are practically no sheath losses.

For three conductor cable, the tables include corrections for 60-cycle extra a-c losses, such as skin effect, proximity effect, and sheath losses. The correction factors used for three conductor cable, due to these losses, are as follows:

Conductor Size B. & S. or 1,000 Circular Mils	Correction Factor for Current Rating
1/0	.99
4/0	.98
300	.97
350	.96
500	.94
600	.93
750	.91

These factors hold, within acceptable limits, for all types of cable and thicknesses of insulation.

USE OF THE TABLES

General

In using these loading tables the preceding conditions and limitations should be kept in mind. Where the actual conditions depart from these, proper allowance should be made.

These tables are based on maximum allowable conductor temperatures and therefore represent maximum allowable current carrying capacities. Capacities of paper and varnished cambric cables are given for N.E.L.A.—N.E.M.A. Standard Preferred Voltage Ratings and the tables are so arranged that interpolation for other voltage ratings can easily be made.

The tables of current ratings "in air" are useful in determining the approximate carrying capacity of any cable or group of cables installed underground, indoors, or outdoors where, due to sources of external heat or other conditions, the thermal characteristics of the surroundings cannot be predetermined exactly. On this basis the approximate carrying capacity can be determined from the "in air" tables by arbitrarily assuming, or assigning, a conservative ambient full load temperature, i.e., the temperature of the air or duct immediately surrounding the cable. This value of ambient

temperature can be approximated by use of good judgment and experience. Actual temperature surveys when possible are of course more accurate and reliable.

Rubber

Ratings of rubber insulated cables are given for two maximum copper temperatures, namely, 60°C. and 75°C. To determine approximate ratings at other maximum copper temperature the ratings of 60°C. may be multiplied by the correction factors given below:

	For 20°C. Earth Ambient	For 40°C. Air Ambient
50°C.	.89	.71
60°C.	1.00	1.00
70°C.	1.10	1.20

D-c Current Carrying Capacities

The direct current ratings of single conductor standard strand cables are of interest. The following table gives the factor by which the a-c rating at 5,000 volts should be multiplied to obtain the d-c rating for d-c voltages up to 1,500 volts.

Conductor Size 1,000 Circular Mils	Correction Factor
300	1.005
350	1.006
400	1.009
500	1.011
600	1.016
700	1.020
750	1.023
800	1.025
1,000	1.036
1,250	1.054
1,500	1.072
1,750	1.092
2,000	1.115

Annular Concentric Stranded Conductors

The current carrying capacities of annular conductor compound-filled paper cables given in the tables are based on the conductor diameters indicated below. The tables are accurate within 2% for other diameters having the same copper area, as follows: up to 1,250,000 C.M. core diameters can be increased or decreased 20%; above 1,250,000 C.M. core diameters can be increased 9% or decreased 15%. The current carrying capacities of annular conductor varnished-cambric cables given in the tables are based on I.P.C.E.A. conductor dimensions.

Size Circular Mils	Inside Diameter Inches	Conductor Diameter Inches
700,000	.40	1.04
800,000	.45	1.13
1,000,000	.56	1.31
1,250,000	.72	1.49
1,500,000	.95	1.71
1,750,000	1.16	1.92
2,000,000	1.25	2.11
2,500,000	1.38	2.36

DIMENSIONS AND 60-CYCLE SKIN EFFECT RATIO OF STRANDED COPPER CONDUCTORS AT 65°C.

This table gives the conductor diameter in inches d, and the 60-cycle skin effect ratio or ratio of alternating to direct-current resistance, both for the ordinary form of stranding (inside diameter = 0) and for annular conductors.

Size Circular Mils	Inside Diameter of Annular Conductor in Inches: 0		0.25		0.50		0.75	
	d	Ratio	d	Ratio	d	Ratio	d	Ratio
3,000,000	1.998	1.439	2.02	1.39	2.08	1.36	2.15	1.29
2,500,000	1.825	1.336	1.87	1.28	1.91	1.24	2.00	1.20
2,000,000	1.631	1.239	1.67	1.20	1.72	1.17	1.80	1.12
1,500,000	1.412	1.145	1.45	1.12	1.52	1.09	1.63	1.06
1,000,000	1.152	1.068	1.19	1.05	1.25	1.03	1.39	1.02
800,000	1.031	1.046	1.07	1.04	1.16	1.02	1.28	1.01
600,000	0.893	1.026	0.94	1.02	1.04	1.01	....	....
500,000	.814	1.018	.86	1.01	0.97	1.01	....	....
400,000	.728	1.012	.78	1.01	....	....	....	....
300,000	.630	1.006	....	....	....	....	....	....

Size Circular Mils	Inside Diameter of Annular Conductor in Inches: 1.00		1.25		1.50		2.00	
	d	Ratio	d	Ratio	d	Ratio	d	Ratio
3,000,000	2.27	1.23	2.39	1.19	2.54	1.15	2.87	1.08
2,500,000	2.12	1.16	2.25	1.12	2.40	1.09	2.75	1.05
2,000,000	1.94	1.09	2.09	1.06	2.25	1.05	2.61	1.02
1,500,000	1.75	1.04	1.91	1.03	2.07	1.02	2.47	1.01
1,000,000	1.53	1.01	1.72	1.01	....	....	....	....
800,000	1.45	1.01	....	....	....	....	....	....

CURRENT CARRYING CAPACITY OIL-FILLED PAPER CABLES

SINGLE CONDUCTOR CABLES

Number of Loaded Cables in Duct Bank	Maximum Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils																		
			1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	900	1,000	1,250	1,500	1,750	2,000
75% LOAD FACTOR																					
Open-Circuited Sheath (Bonded and grounded at one point only.)																					
			Amperes per Conductor																		
3*	34,500	75.0	256	287	320	378	405	450	492	528	592	655	712	742	767	822	872	990	1,082	1,165	1,240
	46,000	75.0	...	286	310	367	395	440	482	512	592	650	710	740	765	820	870	982	1,075	1,162	1,240
	69,000	75.0	...	282	300	367	390	430	470	502	568	628	688	715	740	795	845	955	1,043	1,125	1,200
	115,000	70.0	...	...	...	347	365	402	438	470	530	585	635	667	685	737	775	875	957	1,030	1,100
	138,000	70.0	...	...	...	335	352	392	427	460	522	578	630	658	680	722	762	852	935	1,002	1,070

*For six loaded cables in duct bank apply the following correction factors to the ratings for three loaded cables:

Maximum Voltage	Correction Factor
34,500	.913
46,000	.913
69,000	.915
115,000	.908
138,000	.908

See footnotes page 265

CURRENT CARRYING CAPACITY OIL-FILLED PAPER CABLES

SINGLE CONDUCTOR CABLES (Continued)

75% LOAD FACTOR

Short-Circuited Sheath (Bonded and grounded at several points.)

Number of Loaded Cables in Duct Bank	Maximum Three Phase Line Voltage Volts	Max. Copper Temp. °C.	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	900	1,000	1,250	1,500	1,750	2,000
			Amperes per Conductor																		
3† or 6†	34,500	75.0	238	270	285	327	343	372	397	420	457	487	513	525	535	553	568	603	628	650	670
	46,000	75.0	...	265	280	320	335	365	393	415	453	485	510	522	532	551	568	603	628	650	668
	69,000	75.0	...	262	275	320	333	365	390	410	448	478	504	518	528	548	568	603	628	650	665
	115,000	70.0	...	...	262	295	315	340	365	385	422	450	475	490	498	518	537	570	595	620	635
	138,000	70.0	...	...	257	295	313	337	363	383	418	448	472	485	492	515	530	565	587	610	628

Conductor size: B. & S. or 1,000 Circular Mils.

†Ratings given apply to either three or six loaded cables in duct bank, if cables are arranged as follows, the spacings being 7½ in.:

Arrangement for Three Cables	Arrangement for Six Cables
ABC	ABC
	CBA

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. For other ambient temperatures apply the following correction factors:

Ambient Temp.	34,500 v.	46,000 v.	69,000 v.	115,000 v.	138,000 v.
10°C.	1.08	1.08	1.08	1.08	1.09
20°C.	1.00	1.00	1.00	1.00	1.00
30°C.	0.90	0.90	0.90	0.89	0.89
40°C.	.79	.79	.79	.77	.77

Ratings include dielectric loss and skin effect.

All cables in outside ducts.

Conductors are hollow core, 0.5 in. clear diameter.

CURRENT CARRYING CAPACITY OIL-FILLED PAPER CABLES

THREE CONDUCTOR SHIELDED CABLES

Number of Loaded Cables in Duct Bank	Maximum Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
75% LOAD FACTOR														
			Amperes per Conductor											
3‡	34,500	75.0	168	190	210	240	262	295	320	342	382	417	445	460
	46,000	75.0	...	190	210	240	265	295	320	342	382	417	445	460
	69,000	75.0	...	...	210	240	265	295	320	342	380	412	440	455

‡For six loaded cables in duct bank apply the following correction factors to the ratings for three loaded cables:

Maximum Voltage	Correction Factor
34,500	.885
46,000	.882
69,000	.875

Ratings include dielectric loss and extra a-c losses, such as sheath loss and proximity loss.

All cables in outside ducts.

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. For other ambient temperatures apply the following correction factors:

Ambient Temp.	34,500 v.	46,000 v.	69,000 v.
10°C.	1.08	1.08	1.08
20°C.	1.00	1.00	1.00
30°C.	0.90	0.90	0.90
40°C.	.79	.79	.79

Sector conductors. Approximate correction factor for round conductor cable is .99.

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES
SINGLE CONDUCTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000	1,250	1,500	1,750	2,000
50% LOAD FACTOR																								
			Amperes per Conductor																					
3	7,500	85.0	...	...	...	...	240	282	325	378	416	465	510	555	640	718	794	827	862	986	1,120	1,235	1,338	1,440
	15,000	81.5	...	...	...	...	238	266	310	362	400	450	496	538	622	698	766	798	828	940	1,070	1,180	1,270	1,360
	23,000	76.5	...	...	...	...	228	260	300	346	384	432	470	514	592	664	728	758	786	914	1,018	1,122	1,208	1,288
	34,500	70.0	...	...	...	...	214	244	282	324	358	400	438	478	548	612	670	698	726	830	940	1,032	1,114	1,190
	46,000	63.5	...	...	...	...	...	...	263	305	336	372	408	442	504	560	610	634	658	752	850	936	1,010	1,080
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	378	408	468	520	568	590	612	694	786	860	928	990
6	7,500	85.0	...	...	...	...	235	270	313	362	398	446	490	530	610	686	752	784	814	924	1,038	1,142	1,238	1,334
	15,000	81.5	...	...	...	...	228	252	294	342	382	430	474	514	592	654	714	744	774	885	998	1,102	1,192	1,272
	23,000	76.5	...	...	...	...	220	248	285	330	366	412	450	492	564	624	680	706	733	840	955	1,048	1,128	1,202
	34,500	70.0	...	...	...	...	207	233	272	312	344	384	422	458	524	586	640	666	690	784	904	970	1,040	1,104
	46,000	63.5	...	...	...	...	...	...	254	292	322	358	390	422	480	532	580	604	628	716	810	906	940	1,018
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	360	390	446	496	538	560	580	656	744	812	870	926
9	7,500	85.0	...	...	...	...	230	262	298	350	382	426	470	508	586	654	717	745	772	875	984	1,076	1,162	1,246
	15,000	81.5	...	...	...	...	221	242	282	330	366	414	442	490	563	622	680	710	736	840	948	1,042	1,122	1,194
	23,000	76.5	...	...	...	...	212	240	276	320	354	397	432	470	539	600	654	680	704	798	902	990	1,062	1,128
	34,500	70.0	...	...	...	...	199	226	262	302	334	370	406	438	500	554	606	630	654	742	838	918	982	1,038
	46,000	63.5	...	...	...	...	...	...	246	282	310	344	376	406	460	510	556	580	600	680	770	840	904	962
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	344	370	426	468	510	530	548	620	702	768	822	872
12	7,500	85.0	...	...	...	...	226	254	290	338	370	412	450	488	558	624	680	706	732	828	934	1,002	1,098	1,170
	15,000	81.5	...	...	...	...	214	242	278	322	352	396	436	470	538	598	653	678	702	797	896	982	1,040	1,120
	23,000	76.5	...	...	...	...	205	236	268	308	342	380	414	450	514	554	626	650	672	760	850	932	1,020	1,065
	34,500	70.0	...	...	...	...	193	222	252	290	320	356	388	418	478	528	578	600	622	704	796	864	926	980
	46,000	63.5	...	...	...	...	...	...	235	270	298	332	360	388	440	490	532	554	572	648	732	798	854	906
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	330	358	406	450	490	508	526	592	668	728	778	824

Ratings are based on 60-cycle (see page 270 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES

SINGLE CONDUCTOR

75% LOAD FACTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000	1,250	1,500	1,750	2,000
			Conductor Size B. & S. or 1,000 Circular Mils — Amperes per Conductor																					
3	7,500	85.0	...	...	...	...	230	266	306	353	390	438	478	520	596	666	728	758	789	896	1,011	1,101	1,202	1,283
	15,000	81.5	...	...	...	...	225	258	296	342	378	421	461	501	575	641	701	731	757	860	970	1,069	1,154	1,228
	23,000	76.5	...	...	...	...	217	248	284	328	362	405	442	478	548	612	668	695	721	818	922	1,015	1,086	1,161
	34,500	70.0	...	...	...	...	204	233	268	308	339	378	413	446	510	568	619	644	669	759	853	939	1,018	1,065
	46,000	63.5	...	...	...	...	...	...	250	288	315	351	384	413	471	524	572	594	618	699	784	862	928	989
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	353	378	434	482	525	545	565	638	720	788	845	897
6	7,500	85.0	...	...	...	...	218	250	290	331	365	407	446	482	553	612	668	695	720	815	917	1,005	1,084	1,151
	15,000	81.5	...	...	...	...	212	244	280	321	353	392	431	465	534	590	644	669	692	784	880	964	1,039	1,100
	23,000	76.5	...	...	...	...	204	234	268	308	338	376	414	445	507	563	612	636	660	746	836	916	989	1,046
	34,500	70.0	...	...	...	...	192	220	250	288	316	350	386	414	470	523	569	590	613	692	774	850	914	967
	46,000	63.5	...	...	...	...	...	...	234	268	294	326	358	385	436	485	529	546	567	640	712	783	840	888
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	329	354	401	445	482	502	518	584	654	715	765	808
9	7,500	85.0	...	...	...	...	207	237	272	314	344	382	419	450	512	570	618	643	667	753	842	922	991	1,050
	15,000	81.5	...	...	...	...	202	230	264	303	332	369	404	435	494	549	596	619	641	724	807	884	949	1,006
	23,000	76.5	...	...	...	...	194	220	252	289	319	353	387	415	471	523	568	590	612	688	768	840	901	956
	34,500	70.0	...	...	...	...	182	207	236	270	298	330	360	387	439	486	529	547	568	639	703	767	823	871
	46,000	63.5	...	...	...	...	...	...	220	252	277	307	334	359	407	450	490	506	525	594	658	717	767	811
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	308	331	374	414	448	464	481	538	601	654	699	736
12	7,500	85.0	...	...	...	...	200	227	260	297	326	362	395	426	484	534	580	604	624	703	784	857	918	968
	15,000	81.5	...	...	...	...	193	220	251	286	315	350	381	409	467	515	560	581	600	675	754	820	879	929
	23,000	76.5	...	...	...	...	184	210	240	275	301	334	364	392	445	491	532	552	571	642	715	779	835	880
	34,500	70.0	...	...	...	...	173	197	224	256	281	312	338	366	413	456	495	513	530	595	662	722	774	815
	46,000	63.5	...	...	...	...	...	...	209	238	263	290	314	340	382	421	458	474	490	550	610	665	712	749
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	289	311	351	387	418	433	448	500	558	605	645	677

Ratings are based on 60-cycle (see page 270 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES
SINGLE CONDUCTOR

100% LOAD FACTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000	1,250	1,500	1,750	2,000
													Amperes per Conductor											
3	7,500	85.0	...	...	...	...	218	250	288	330	364	406	445	482	552	614	670	696	722	816	922	1,006	1,082	1,150
	15,000	81.5	...	...	...	...	214	236	272	314	348	390	428	464	532	590	644	668	692	784	880	963	1,022	1,100
	23,000	76.5	...	...	...	...	206	236	266	304	336	376	410	442	506	566	616	640	662	746	838	916	982	1,046
	34,500	70.0	...	...	...	...	194	222	250	286	316	350	380	412	470	520	568	590	610	692	780	850	910	968
	46,000	63.5	...	...	...	...	...	...	234	270	294	326	354	382	436	480	524	544	562	640	706	784	838	888
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	328	352	400	443	482	500	518	586	658	716	762	808
6	7,500	85.0	...	...	...	...	200	234	267	306	334	370	404	434	494	552	614	670	694	722	815	882	942	998
	15,000	81.5	...	...	...	...	195	214	248	283	318	356	392	422	477	526	572	594	614	694	774	844	904	956
	23,000	76.5	...	...	...	...	188	212	240	276	304	338	368	398	454	502	548	568	588	660	738	802	858	908
	34,500	70.0	...	...	...	...	177	199	228	262	288	318	346	376	424	468	508	526	544	612	686	744	794	838
	46,000	63.5	...	...	...	...	...	...	212	244	266	296	322	346	390	430	470	488	506	566	628	686	735	772
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	296	318	360	394	428	442	458	512	576	624	662	696
9	7,500	85.0	...	...	...	...	187	214	244	280	307	338	370	398	455	498	540	560	580	652	734	794	847	893
	15,000	81.5	...	...	...	...	182	200	230	266	296	330	360	386	434	477	519	538	557	628	700	760	810	854
	23,000	76.5	...	...	...	...	174	198	222	256	280	312	340	366	416	462	502	518	536	594	662	718	768	810
	34,500	70.0	...	...	...	...	164	186	212	232	262	292	314	338	384	424	458	474	490	552	620	670	714	752
	46,000	63.5	...	...	...	...	...	...	192	220	242	268	296	322	352	390	424	438	452	502	566	608	652	684
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	270	290	327	360	388	402	414	462	513	554	580	619
12	7,500	85.0	...	...	...	...	176	200	228	260	286	316	343	370	420	462	502	518	536	602	672	730	777	820
	15,000	81.5	...	...	...	...	170	188	217	248	276	306	332	358	402	444	482	498	516	578	642	694	740	780
	23,000	76.5	...	...	...	...	164	186	206	238	262	290	314	340	384	424	458	476	490	544	608	660	700	738
	34,500	70.0	...	...	...	...	154	175	200	226	248	274	296	318	358	392	426	440	454	508	566	610	648	680
	46,000	63.5	...	...	...	...	...	...	180	204	224	248	268	284	324	354	382	396	406	452	502	542	574	600
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	250	268	300	327	352	367	378	422	468	502	530	558

Ratings are based on 60-cycle (see page 270 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES
SINGLE CONDUCTOR (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000	1,250	1,500	1,750	2,000
50% TO 100% LOAD FACTOR																								
			Amperes per Conductor																					
Cables in Air	7,500	85.0	89	118	157	181	214	249	289	337	373	419	466	508	588	660	730	762	796	917	1,052	1,174	1,273	1,377
	15,000	81.5	86	116	154	178	206	238	275	320	354	398	441	479	558	625	689	721	749	864	986	1,099	1,191	1,293
	23,000	76.5	...	...	148	171	194	223	256	298	330	370	410	447	516	579	639	666	694	799	910	1,013	1,102	1,192
	34,500	70.0	...	...	...	...	175	201	230	266	296	331	365	398	458	514	566	590	616	705	804	896	973	1,047
	46,000	63.5	...	...	...	...	...	...	204	235	260	292	321	350	399	447	493	510	534	610	693	772	844	901
	69,000	60.0	...	...	...	...	...	...	...	...	...	...	278	300	344	384	422	439	457	520	594	655	710	758

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

CABLES IN DUCTS

Ambient Temp.	7,500 v.	15,000 v.	23,000 v.	34,500 v.	46,000 v.	69,000 v.
10°C.	1.07	1.08	1.09	1.10	1.11	1.12
20°C.	1.00	1.00	1.00	1.00	1.00	1.00
30°C.	0.92	0.92	0.90	0.90	0.88	0.87
40°C.	.83	.82	.80	.78	.74	.71
50°C.	.73	.72	.69	.63	.56	.50

For cables in ducts, all outside ducts are assumed.

CABLES IN AIR

Ambient Temp.	7,500 v.	15,000 v.	23,000 v.	34,500 v.	46,000 v.	69,000 v.
20°C.	1.20	1.22	1.25	1.29	1.36	1.42
30°C.	1.11	1.12	1.13	1.15	1.20	1.23
40°C.	1.00	1.00	1.00	1.00	1.00	1.00
50°C.	0.88	0.87	0.85	0.82	0.76	0.71

For cables in air, ratings are for any load factor from 50% to 100%.

Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., sheaths are bonded and grounded at one point only so that there are practically no sheath losses.

CURRENT CARRYING CAPACITY COMPOUND-FILLED PAPER CABLES

SINGLE CONDUCTOR—ANNULAR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size—1,000 Circular Mils* 700	800	1,000	1,250	1,500	1,750	2,000	2,500
50% LOAD FACTOR										
			Amperes per Conductor							
3	7,500	85.0	820	892	1,030	1,200	1,358	1,510	1,642	1,882
	15,000	81.5	786	856	990	1,150	1,318	1,422	1,550	1,800
	23,000	76.5	742	814	940	1,086	1,226	1,362	1,492	1,690
	34,500	70.0	690	752	868	1,002	1,130	1,256	1,378	1,556
	46,000	63.5	628	686	790	912	1,026	1,134	1,238	1,404
	69,000	60.0	580	632	730	840	944	1,042	1,138	1,288
6	7,500	85.0	768	838	963	1,120	1,258	1,384	1,500	1,716
	15,000	81.5	738	804	926	1,066	1,200	1,318	1,426	1,640
	23,000	76.5	702	764	880	1,010	1,140	1,258	1,364	1,550
	34,500	70.0	650	710	816	938	1,054	1,162	1,264	1,434
	46,000	63.5	600	652	748	858	966	1,058	1,144	1,304
	69,000	60.0	552	600	688	788	884	974	1,052	1,188
9	7,500	85.0	728	792	912	1,056	1,175	1,288	1,390	1,588
	15,000	81.5	700	762	878	1,004	1,126	1,236	1,336	1,520
	23,000	76.5	666	726	832	952	1,066	1,170	1,272	1,440
	34,500	70.0	618	674	774	888	938	1,086	1,174	1,338
	46,000	63.5	572	620	710	814	910	993	1,070	1,214
	69,000	60.0	526	570	650	742	830	914	986	1,104
12	7,500	85.0	696	754	864	994	1,106	1,210	1,340	1,480
	15,000	81.5	668	726	828	948	1,060	1,160	1,250	1,414
	23,000	76.5	636	690	790	904	1,010	1,102	1,188	1,348
	34,500	70.0	590	640	732	838	938	1,020	1,096	1,244
	46,000	63.5	544	592	676	772	860	938	1,010	1,140
	69,000	60.0	500	544	620	705	786	860	926	1,036
Cables in Air	7,500	85.0	757	835	978	1,154	1,313	1,473	1,616	1,890
	15,000	81.5	712	783	918	1,082	1,231	1,379	1,513	1,767
	23,000	76.5	659	725	848	998	1,134	1,269	1,390	1,620
	34,500	70.0	583	641	748	879	998	1,113	1,219	1,415
	46,000	63.5	505	556	649	761	863	958	1,046	1,212
	69,000	60.0	435	476	551	636	728	813	895	1,020

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	Cables in Ducts 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts	Cables in Air 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts
10°C.	1.07	1.08	1.09	1.10	1.11	1.12	....	....	....	....	....	....
20°C.	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.22	1.25	1.29	1.36	1.42
30°C.	0.92	0.92	0.90	0.90	0.88	0.87	1.11	1.12	1.13	1.15	1.20	1.23
40°C.	.83	.82	.80	.78	.74	.71	1.00	1.00	1.00	1.00	1.00	1.00
50°C.	.73	.72	.69	.63	.56	.50	0.88	0.87	0.85	0.82	0.76	0.71

Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., sheaths are bonded and grounded at one point only so that there are practically no sheath losses.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

*See Annular Concentric Stranded Conductors, page 262.

CURRENT CARRYING CAPACITY COMPOUND-FILLED PAPER CABLES

SINGLE CONDUCTOR—ANNULAR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size—1,000 Circular Mils* 700	800	1,000	1,250	1,500	1,750	2,000	2,500
75% LOAD FACTOR										
			Amperes per Conductor							
3	7,500	85.0	747	813	938	1,079	1,214	1,335	1,445	1,645
	15,000	81.5	718	781	900	1,033	1,162	1,277	1,380	1,575
	23,000	76.5	682	742	855	982	1,105	1,211	1,312	1,493
	34,500	70.0	633	689	794	910	1,023	1,119	1,215	1,379
	46,000	63.5	586	636	732	838	940	1,028	1,111	1,264
	69,000	60.0	538	584	666	760	856	940	1,020	1,145
6	7,500	85.0	683	741	853	973	1,087	1,185	1,277	1,447
	15,000	81.5	658	713	816	931	1,042	1,137	1,223	1,384
	23,000	76.5	625	679	777	886	990	1,078	1,162	1,316
	34,500	70.0	581	632	720	822	918	999	1,075	1,217
	46,000	63.5	536	584	664	758	845	920	989	1,117
	69,000	60.0	493	534	607	687	770	841	908	1,011
9	7,500	85.0	633	685	784	892	994	1,078	1,159	1,305
	15,000	81.5	608	659	752	856	953	1,035	1,111	1,250
	23,000	76.5	578	627	715	813	903	982	1,054	1,185
	34,500	70.0	537	583	663	753	835	909	975	1,095
	46,000	63.5	496	539	611	693	768	835	896	1,005
	69,000	60.0	456	493	556	630	700	761	818	908
12	7,500	85.0	593	641	729	827	918	994	1,066	1,198
	15,000	81.5	570	617	699	792	880	953	1,021	1,147
	23,000	76.5	542	587	665	753	835	905	968	1,086
	34,500	70.0	504	545	617	699	772	837	896	1,001
	46,000	63.5	465	504	568	643	707	768	822	916
	69,000	60.0	425	458	516	581	644	697	746	825
Cables in Air	7,500	85.0	757	835	978	1,154	1,313	1,473	1,616	1,890
	15,000	81.5	712	783	918	1,082	1,231	1,379	1,513	1,767
	23,000	76.5	659	725	848	998	1,134	1,269	1,390	1,620
	34,500	70.0	583	641	748	879	998	1,113	1,219	1,415
	46,000	63.5	505	556	649	761	863	958	1,046	1,212
	69,000	60.0	435	476	551	636	728	813	895	1,020

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	CABLES IN DUCTS 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts	CABLES IN AIR 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts
10°C.	1.07	1.08	1.09	1.10	1.11	1.12	....	....	....	....	....	....
20°C.	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.22	1.25	1.29	1.36	1.42
30°C.	0.92	0.92	0.90	0.90	0.88	0.87	1.11	1.12	1.13	1.15	1.20	1.23
40°C.	.83	.82	.80	.78	.74	.71	1.00	1.00	1.00	1.00	1.00	1.00
50°C.	.73	.72	.69	.63	.56	.50	0.88	0.87	0.85	0.82	0.76	0.71

Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., sheaths are bonded and grounded at one point only so that there are practically no sheath losses.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

*See Annular Concentric Stranded Conductors, page 262.

CURRENT CARRYING CAPACITY
COMPOUND-FILLED PAPER CABLES
SINGLE CONDUCTOR—ANNULAR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size—1,000 Circular Mils* 700	800	1,000	1,250	1,500	1,750	2,000	2,500
100% LOAD FACTOR										
			Amperes per Conductor							
3	7,500	85.0	684	742	850	976	1,086	1,184	1,276	1,446
	15,000	81.5	658	714	816	930	1,040	1,136	1,224	1,384
	23,000	76.5	624	680	776	888	990	1,080	1,162	1,316
	34,500	70.0	580	630	720	822	916	998	1,074	1,218
	46,000	63.5	536	582	664	758	842	918	988	1,114
	69,000	60.0	492	532	608	690	770	840	904	1,010
6	7,500	85.0	608	658	750	856	950	1,032	1,104	1,240
	15,000	81.5	584	632	720	818	908	986	1,057	1,186
	23,000	76.5	556	602	682	776	860	933	1,000	1,124
	34,500	70.0	516	558	634	718	796	864	926	1,036
	46,000	63.5	476	516	585	662	732	794	850	950
	69,000	60.0	438	470	530	598	664	722	774	856
9	7,500	85.0	550	596	674	766	842	916	984	1,092
	15,000	81.5	530	574	648	736	806	870	930	1,050
	23,000	76.5	504	544	616	696	768	830	888	988
	34,500	70.0	470	506	572	644	712	772	826	916
	46,000	63.5	432	464	522	586	646	696	744	824
	69,000	60.0	398	424	474	533	590	636	676	744
12	7,500	85.0	512	550	622	708	780	850	908	1,000
	15,000	81.5	490	526	594	670	736	790	842	950
	23,000	76.5	464	500	565	634	696	754	810	890
	34,500	70.0	430	465	524	586	644	696	744	820
	46,000	63.5	390	414	464	520	570	612	650	712
	69,000	60.0	360	385	432	480	525	566	600	654
Cables in Air	7,500	85.0	757	835	978	1,154	1,313	1,473	1,616	1,890
	15,000	81.5	712	783	918	1,082	1,231	1,379	1,513	1,767
	23,000	76.5	659	725	848	998	1,134	1,269	1,390	1,620
	34,500	70.0	583	641	748	879	998	1,113	1,219	1,415
	46,000	63.5	505	556	649	761	863	958	1,046	1,212
	69,000	60.0	435	476	551	636	728	813	895	1,020

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	CABLES IN DUCTS 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts	CABLES IN AIR 7,500 Volts	15,000 Volts	23,000 Volts	34,500 Volts	46,000 Volts	69,000 Volts
10°C.	1.07	1.08	1.09	1.10	1.11	1.12	....	....	....	....	....	....
20°C.	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.22	1.25	1.29	1.36	1.42
30°C.	0.92	0.92	0.90	0.90	0.88	0.87	1.11	1.12	1.13	1.15	1.20	1.23
40°C.	.83	.82	.80	.78	.74	.71	1.00	1.00	1.00	1.00	1.00	1.00
50°C.	.73	.72	.69	.63	.56	.50	0.88	0.87	0.85	0.82	0.76	0.71

Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., sheaths are bonded and grounded at one point only so that there are practically no sheath losses.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

*See Annular Concentric Stranded Conductors, page 262.

CURRENT CARRYING CAPACITY
COMPOUND-FILLED PAPER CABLES
THREE CONDUCTOR SECTOR
TYPE H (Shielded)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
50% LOAD FACTOR														
			Amperes per Conductor											
3	15,000	81.5	186	209	239	274	300	334	364	390	442	487	530	546
	23,000	76.5	...	204	234	268	292	327	356	382	432	473	512	528
	34,500	70.0	...	...	...	255	276	306	333	358	401	442	478	492
6	15,000	81.5	175	197	224	256	278	311	336	360	405	445	482	498
	23,000	76.5	...	190	205	250	272	302	326	350	397	434	467	480
	34,500	70.0	...	...	...	235	256	284	307	328	370	404	436	448
9	15,000	81.5	165	185	210	241	263	291	314	335	377	414	446	461
	23,000	76.5	...	183	208	235	254	281	302	324	366	400	428	438
	34,500	70.0	...	...	...	218	238	264	287	305	342	374	403	414
12	15,000	81.5	156	175	196	227	245	274	295	314	354	388	420	430
	23,000	76.5	...	170	194	221	240	264	284	303	340	371	400	409
	34,500	70.0	...	...	...	208	224	246	266	284	319	348	374	384
75% LOAD FACTOR														
3	15,000	81.5	170	193	218	249	270	300	326	347	390	430	464	476
	23,000	76.5	...	187	212	242	263	290	316	337	381	415	446	458
	34,500	70.0	...	...	...	230	246	274	296	314	354	388	418	430
6	15,000	81.5	153	174	197	224	242	268	291	308	346	379	408	419
	23,000	76.5	...	167	189	216	234	258	280	297	331	364	390	400
	34,500	70.0	...	...	...	203	219	240	261	277	311	340	364	373
9	15,000	81.5	141	159	179	204	221	244	263	279	313	342	368	376
	23,000	76.5	...	154	174	197	212	232	252	267	300	326	350	357
	34,500	70.0	...	...	...	185	197	216	235	249	278	304	326	333
12	15,000	81.5	132	148	167	189	204	225	243	256	287	313	337	344
	23,000	76.5	...	142	161	182	194	214	231	246	274	298	319	326
	34,500	70.0	...	...	...	168	181	200	215	227	254	276	294	302
100% LOAD FACTOR														
3	15,000	81.5	153	171	196	224	242	268	288	308	345	378	408	420
	23,000	76.5	...	166	188	216	233	258	277	295	331	362	390	400
	34,500	70.0	...	...	...	202	218	240	259	276	310	338	363	373
6	15,000	81.5	135	151	171	196	210	233	250	266	296	322	348	358
	23,000	76.5	...	146	166	188	203	222	239	254	284	308	331	340
	34,500	70.0	...	...	...	175	188	206	222	236	263	286	307	315
9	15,000	81.5	121	134	153	173	186	206	221	234	261	284	304	310
	23,000	76.5	...	132	149	168	180	198	211	224	252	272	291	296
	34,500	70.0	...	...	...	156	167	183	196	207	230	250	267	274
12	15,000	81.5	112	125	142	161	172	189	202	214	237	256	273	288
	23,000	76.5	...	120	135	153	164	180	192	203	225	242	259	266
	34,500	70.0	...	...	...	139	149	165	175	185	203	218	232	236

Ratings are based on 60-cycle (see page 275 for footnotes).

CURRENT CARRYING CAPACITY COMPOUND-FILLED PAPER CABLES

THREE CONDUCTOR SECTOR TYPE H (Shielded) (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils											
			1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
50% TO 100% LOAD FACTOR														
			Amperes per Conductor											
Cables in Air	15,000	81.5	171	196	226	262	287	324	355	380	434	481	526	546
	23,000	76.5	...	188	216	248	274	306	334	356	408	455	494	512
	34,500	70.0	...	...	...	234	253	285	310	332	377	417	453	476

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	Cables in Ducts 15,000 v.	Cables in Ducts 23,000 v.	Cables in Ducts 34,500 v.	Cables in Air 15,000 v.	Cables in Air 23,000 v.	Cables in Air 34,500 v.
10°C.	1.08	1.09	1.10	....	....	....
20°C.	1.00	1.00	1.00	1.22	1.25	1.29
30°C.	0.92	0.91	0.90	1.12	1.13	1.15
40°C.	.82	.80	.78	1.00	1.00	1.00
50°C.	.72	.69	.63	0.87	0.85	0.82

Ratings include dielectric loss and extra a-c losses, such as sheath loss and proximity loss.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

Approximate correction factor for round conductor cable is .99.

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES

THREE CONDUCTOR BELTED TYPE

50% LOAD FACTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
			Amperes per Conductor																
3	4,500	85.0	57	75	99	130	150	173	197	226	262	287	320	348	374	424	466	506	522
	7,500	82.5	..	74	97	128	145	170	191	220	256	280	314	341	366	413	455	495	510
	15,000	75.0	..	70	92	122	138	160	181	208	241	263	295	322	344	388	427	462	475
	23,000	67.0	..	..	..	114	132	151	169	195	222	244	272	294	314	352	388	421	434
6	4,500	85.0	56	73	96	126	144	165	189	216	248	271	300	329	348	395	436	475	490
	7,500	82.5	..	72	95	125	141	162	183	211	243	265	294	320	339	388	427	463	478
	15,000	75.0	..	69	91	117	133	151	172	197	227	246	275	298	320	362	399	432	446
	23,000	67.0	..	..	..	109	125	143	154	175	213	230	254	276	295	332	364	394	406
9	4,500	85.0	55	71	93	123	140	157	178	203	234	254	284	306	330	372	411	446	460
	7,500	82.5	..	70	92	120	135	154	175	201	230	250	277	302	324	366	402	436	450
	15,000	75.0	..	67	88	109	126	143	164	186	216	234	260	283	303	341	358	408	422
	23,000	67.0	..	..	..	101	118	136	154	175	201	218	242	261	279	313	344	374	384
12	4,500	85.0	54	69	88	114	132	150	170	194	224	243	272	294	314	354	388	418	432
	7,500	82.5	..	69	88	114	128	146	165	188	218	238	264	287	306	344	378	410	423
	15,000	75.0	..	66	84	108	120	137	157	177	204	221	246	267	287	322	352	384	396
	23,000	67.0	..	..	..	101	115	131	146	166	190	206	231	248	263	295	323	350	360

Ratings are based on 60-cycle (see page 279 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES

THREE CONDUCTOR BELTED TYPE
(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
75% LOAD FACTOR																			
			Amperes per Conductor																
3	4,500	85.0	55	71	93	122	140	160	181	210	241	261	291	315	338	384	423	459	474
	7,500	82.5	..	70	92	121	138	158	179	206	237	257	286	310	333	376	415	450	465
	15,000	75.0	..	67	87	115	131	148	169	192	221	242	268	292	312	350	388	420	432
	23,000	67.0	..	..	..	107	124	140	157	180	206	223	247	270	285	322	354	382	395
6	4,500	85.0	51	67	87	113	130	147	166	190	218	238	265	286	306	345	380	410	423
	7,500	82.5	..	66	86	111	128	144	164	187	214	233	260	280	299	338	372	402	415
	15,000	75.0	..	63	82	106	121	137	156	176	201	219	242	264	280	316	348	376	388
	23,000	67.0	..	..	..	99	113	128	144	165	187	204	227	244	260	290	320	344	354
9	4,500	85.0	49	63	82	106	122	137	156	176	202	219	244	263	281	316	348	373	386
	7,500	82.5	..	62	81	105	119	135	153	172	198	215	240	258	276	309	340	366	377
	15,000	75.0	..	59	77	99	113	127	143	163	186	202	224	243	258	290	317	343	350
	23,000	67.0	..	..	..	92	107	119	133	152	172	188	206	223	236	265	292	314	322
12	4,500	85.0	46	60	78	100	114	128	145	166	189	204	227	245	261	293	321	344	356
	7,500	82.5	..	59	77	98	112	127	143	163	185	201	223	240	256	288	314	338	348
	15,000	75.0	..	56	73	94	106	120	135	153	175	188	204	226	240	267	293	316	322
	23,000	67.0	..	..	..	88	100	113	126	142	162	175	193	207	222	245	269	288	296

Ratings are based on 60-cycle (see page 279 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES

THREE CONDUCTOR BELTED TYPE

(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
100% LOAD FACTOR																			
			Amperes per Conductor																
3	4,500	85.0	52	67	86	113	130	147	165	191	218	238	265	287	307	345	378	409	420
	7,500	82.5	..	66	86	113	127	144	163	186	214	233	260	281	300	338	371	402	414
	15,000	75.0	..	63	82	107	121	137	154	173	201	218	242	263	281	316	338	376	388
	23,000	67.0	..	..	..	100	112	128	143	163	187	204	227	243	258	290	317	344	354
6	4,500	85.0	49	65	80	105	119	136	150	170	194	210	234	252	271	302	330	355	364
	7,500	82.5	..	64	79	99	113	128	143	166	190	206	229	246	263	295	323	349	358
	15,000	75.0	..	61	75	97	108	122	136	156	178	194	215	232	247	276	302	326	337
	23,000	67.0	..	..	..	90	101	114	128	146	167	180	198	213	227	253	277	298	308
9	4,500	85.0	46	61	75	95	108	121	136	154	176	191	211	229	243	272	295	317	326
	7,500	82.5	..	60	72	93	103	119	133	152	172	187	207	224	238	265	289	312	322
	15,000	75.0	..	57	69	87	99	112	125	142	162	174	193	207	220	246	269	289	297
	23,000	67.0	..	..	..	81	93	105	117	132	151	163	178	192	204	226	246	263	270
12	4,500	85.0	43	57	69	88	99	112	125	142	163	175	195	210	222	246	268	286	293
	7,500	82.5	..	56	67	87	97	110	123	140	159	172	190	204	217	241	261	280	286
	15,000	75.0	..	54	64	80	91	103	116	131	149	161	177	189	201	223	241	258	264
	23,000	67.0	..	..	..	75	85	96	106	120	136	147	162	174	183	203	220	236	241

Ratings are based on 60-cycle (see page 279 for footnotes).

CURRENT CARRYING CAPACITY—COMPOUND-FILLED PAPER CABLES

THREE CONDUCTOR BELTED TYPE

(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
			Conductor Size B. & S. or 1,000 Circular Mils																
50% TO 100% LOAD FACTOR																			
			Amperes per Conductor																
Cables in Air	4,500	85.0	51	67	89	118	137	158	181	210	246	268	300	330	355	412	459	500	522
	7,500	82.5	..	66	88	116	135	154	177	205	237	262	292	322	348	400	445	488	506
	15,000	75.0	..	62	83	109	124	142	163	187	216	238	266	292	314	356	400	437	450
	23,000	67.0	..	..	..	101	111	128	143	166	190	208	232	254	272	308	342	373	386

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	Cables in Ducts 4,500 v.	Cables in Ducts 7,500 v.	Cables in Ducts 15,000 v.	Cables in Ducts 23,000 v.	Cables in Air 4,500 v.	Cables in Air 7,500 v.	Cables in Air 15,000 v.	Cables in Air 23,000 v
10°C.	1.07	1.08	1.09	1.10	....	....	....	....
20°C.	1.00	1.00	1.00	1.00	1.20	1.21	1.25	1.32
30°C.	0.92	0.92	0.91	0.89	1.11	1.11	1.13	1.17
40°C.	.83	.83	.80	.76	1.00	1.00	1.00	1.00
50°C.	.73	.72	.68	.60	0.88	0.88	0.85	0.80

Ratings include dielectric loss and extra a-c losses, such as sheath loss and proximity loss.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
SINGLE CONDUCTOR—ANNULAR

50% LOAD FACTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size 1,000 Circular Mils* 750	800	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000	5,000	Correction Factors for Various Ambient Temperatures 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
			Amperes per Conductor																
3	4,500	72.5	775	...	960	....	1,275	....	1,532	1,740	1,940	2,310	2,740	1.09	1.00	.90	.78	....	.65
	7,500	70.5	755	...	937	....	1,235	....	1,480	1,680	1,865	2,270	2,625	1.10	1.00	.89	.77	....	.62
	15,000	66.5	705	...	863	....	1,135	....	1,345	1,530	1,695	2,050	2,360	1.10	1.00	.87	.73	....	.54
6	4,500	72.5	732	...	908	....	1,180	....	1,410	1,590	1,765	2,120	2,445	1.10	1.00	.90	.78	....	.65
	7,500	70.5	711	...	875	....	1,140	....	1,355	1,530	1,700	2,035	2,340	1.10	1.00	.89	.77	....	.61
	15,000	66.5	660	...	805	....	1,040	....	1,225	1,395	1,535	1,835	2,085	1.11	1.00	.87	.72	....	.52
9	4,500	72.5	695	...	857	....	1,105	....	1,307	1,475	1,630	1,942	2,220	1.09	1.00	.90	.78	....	.65
	7,500	70.5	673	...	821	....	1,065	....	1,250	1,415	1,560	1,855	2,120	1.10	1.00	.89	.76	....	.61
	15,000	66.5	625	...	760	....	970	....	1,130	1,285	1,405	1,665	1,885	1.12	1.00	.87	.71	....	.50

75% LOAD FACTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	750	800	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000	5,000	10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
3	4,500	72.5	713	...	880	....	1,140	....	1,350	1,530	1,693	2,030	2,320	1.09	1.00	.90	.78	....	.65
	7,500	70.5	694	...	851	....	1,095	....	1,310	1,475	1,620	1,940	2,205	1.10	1.00	.89	.77	....	.61
	15,000	66.5	643	...	780	....	1,005	....	1,180	1,335	1,465	1,750	1,975	1.10	1.00	.87	.69	....	.51
6	4,500	72.5	652	...	800	....	1,022	....	1,200	1,350	1,485	1,760	2,000	1.10	1.00	.90	.78	....	.65
	7,500	70.5	631	...	766	....	985	....	1,145	1,295	1,422	1,675	1,900	1.10	1.00	.89	.77	....	.61
	15,000	66.5	585	...	703	....	890	....	1,035	1,165	1,275	1,500	1,670	1.12	1.00	.86	.70	....	.48
9	4,500	72.5	602	...	732	....	927	....	1,080	1,210	1,330	1,560	1,755	1.09	1.00	.90	.78	....	.65
	7,500	70.5	580	...	702	....	890	....	1,035	1,155	1,270	1,480	1,660	1.10	1.00	.89	.76	....	.60
	15,000	66.5	535	...	638	....	800	....	920	1,025	1,125	1,300	1,430	1.12	1.00	.86	.68	....	.43

Ratings are based on 60-cycle (see page 281 for footnotes).

*See Annular Concentric Stranded Conductors, page 262.

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES

SINGLE CONDUCTOR—ANNULAR

(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size 1,000 Circular Mils* 750	800	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000	5,000	Correction Factors for Various Ambient Temperatures 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
100% LOAD FACTOR																			
			Amperes per Conductor																
3	4,500	72.5	647	...	791	....	1,014	....	1,190	1,340	1,470	1,740	1,985	1.09	1.00	.90	.78	....	.65
	7,500	70.5	627	...	763	....	975	....	1,140	1,285	1,410	1,660	1,870	1.10	1.00	.89	.77	....	.60
	15,000	66.5	580	...	700	....	880	....	1,025	1,160	1,260	1,470	1,642	1.10	1.00	.87	.65	....	.49
6	4,500	72.5	576	...	700	....	882	....	1,023	1,150	1,260	1,470	1,665	1.10	1.00	.90	.78	....	.64
	7,500	70.5	555	...	670	....	840	....	980	1,095	1,195	1,390	1,550	1.10	1.00	.89	.77	....	.60
	15,000	66.5	510	...	605	....	744	....	860	960	1,050	1,200	1,330	1.13	1.00	.85	.67	....	.42
9	4,500	72.5	527	...	629	....	786	....	910	1,015	1,100	1,290	1,450	1.09	1.00	.90	.78	....	.64
	7,500	70.5	500	...	600	....	765	....	860	960	1,045	1,200	1,335	1.10	1.00	.89	.75	....	.58
	15,000	66.5	454	...	535	....	656	....	745	820	892	1,010	1,080	1.14	1.00	.83	.63	....	.31
50% TO 100% LOAD FACTOR																			
Cables in Air	4,500	72.5	678	716	858	1,019	1,170	1,305	1,420	1,630	1,880	2,380	2,840	1.40	1.27	1.15	1.00	.92	.83
	7,500	70.5	650	687	820	971	1,115	1,232	1,343	1,550	1,790	2,240	2,690	1.42	1.30	1.16	1.00	.92	.81
	15,000	66.5	577	608	723	850	970	1,070	1,166	1,350	1,560	1,940	2,310	1.52	1.37	1.20	1.00	.88	.75
	23,000	61.5	488	512	607	708	806	886	964	1,116	1,250	1,530	1,785	1.68	1.49	1.27	1.00	.83	.62

Ratings are based on 60-cycle alternating current and grounded neutral.
Ratings are based on ambient earth temperature 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the correction factors given.
Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., the sheaths are bonded and grounded at one point only so that there are practically no sheath losses.
For cables in ducts, all outside ducts are assumed.
For cables in air, ratings are for any load factor from 50% to 100%.

*See Annular Concentric Stranded Conductors, page 262.

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES SINGLE CONDUCTOR

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600
50% LOAD FACTOR																	
			Amperes per Conductor														
3	4,500	72.5	72	95	123	163	189	219	251	293	342	378	424	465	506	588	658
	7,500	70.5	72	95	123	163	189	219	251	290	337	373	418	463	503	576	646
	15,000	66.5	71	93	121	160	184	212	243	282	325	360	401	441	476	547	612
6	4,500	72.5	70	92	120	158	183	212	243	283	328	363	406	445	483	558	625
	7,500	70.5	70	92	120	158	183	212	243	279	323	356	398	441	478	546	610
	15,000	66.5	69	90	118	155	178	203	234	270	310	343	381	418	451	516	578
9	4,500	72.5	69	90	117	154	178	205	235	273	315	349	390	427	463	534	596
	7,500	70.5	69	90	117	154	178	205	235	270	311	343	383	423	458	522	582
	15,000	66.5	68	88	115	150	172	197	226	260	298	329	365	400	431	492	546

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size, 1,000 Circular Mils: 700	750	800	1,000	1,250	1,500	1,750	2,000	Correction Factors for Various Ambient Temperatures: 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
3	4,500	72.5	724	754	784	894	1,022	1,125	1,230	1,310	1.09	1.00	.90	.79	...	.65
	7,500	70.5	710	741	769	882	1,000	1,090	1,200	1,286	1.10	1.00	.89	.77	...	.63
	15,000	66.5	674	700	726	830	935	1,035	1,120	1,195	1.11	1.00	.88	.73	...	.55
6	4,500	72.5	684	712	740	840	956	1,053	1,137	1,220	1.09	1.00	.90	.79	...	.65
	7,500	70.5	669	697	724	826	934	1,013	1,110	1,185	1.10	1.00	.89	.77	...	.63
	15,000	66.5	642	659	680	774	867	954	1,032	1,110	1.11	1.00	.88	.73	...	.55
9	4,500	72.5	652	678	704	797	903	993	1,070	1,140	1.09	1.00	.90	.79	...	.65
	7,500	70.5	637	663	688	783	882	956	1,045	1,110	1.10	1.00	.89	.77	...	.62
	15,000	66.5	608	623	644	729	816	900	965	1,035	1.11	1.00	.87	.73	...	.54

Ratings are based on 60-cycle (see page 285 for footnotes).

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
SINGLE CONDUCTOR (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600
75% LOAD FACTOR																	
			Amperes per Conductor														
3	4,500	72.5	69	91	119	156	180	209	239	278	322	356	398	436	473	546	610
	7,500	70.5	69	91	119	156	180	209	239	274	317	350	390	432	468	534	596
	15,000	66.5	68	89	116	153	175	200	230	265	303	335	372	410	440	503	558
6	4,500	72.5	67	87	113	148	171	198	225	262	301	333	372	405	440	506	563
	7,500	70.5	67	87	113	148	171	198	225	257	297	327	364	400	433	492	548
	15,000	66.5	66	85	111	144	165	188	216	248	284	313	346	378	408	464	514
9	4,500	72.5	64	84	108	141	163	187	213	247	283	313	347	380	411	469	520
	7,500	70.5	64	84	108	141	163	187	213	243	279	307	341	374	404	458	508
	15,000	66.5	63	81	105	136	155	178	202	232	265	292	322	351	378	429	474

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size, 1,000 Circular Mils: 700	750	800	1,000	1,250	1,500	1,750	2,000	Correction Factors for Various Ambient Temperatures: 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
3	4,500	72.5	668	694	722	816	928	1,025	1,100	1,175	1.09	1.00	.90	.79	...	.65
	7,500	70.5	652	680	705	804	906	984	1,075	1,145	1.10	1.00	.89	.77	...	.63
	15,000	66.5	622	638	660	748	838	926	993	1,066	1.11	1.00	.88	.73	...	.55
6	4,500	72.5	616	639	663	748	845	927	995	1,060	1.09	1.00	.90	.79	...	.65
	7,500	70.5	598	622	645	730	820	890	966	1,025	1.10	1.00	.89	.77	...	.63
	15,000	66.5	570	584	605	680	760	840	891	952	1.11	1.00	.87	.73	...	.54
9	4,500	72.5	568	589	612	688	774	845	907	962	1.09	1.00	.90	.79	...	.65
	7,500	70.5	554	575	596	672	754	816	882	934	1.10	1.00	.89	.77	...	.62
	15,000	66.5	516	534	554	621	692	754	806	850	1.11	1.00	.87	.72	...	.52

Ratings are based on 60-cycle (see page 285 for footnotes).

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
SINGLE CONDUCTOR (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600
100% LOAD FACTOR																	
			Amperes per Conductor														
3	4,500	72.5	66	87	113	148	171	197	224	261	299	330	368	404	437	501	558
	7,500	70.5	66	87	113	148	171	197	224	256	295	325	361	398	430	491	544
	15,000	66.5	65	85	110	143	164	187	214	246	282	311	344	375	405	460	508
6	4,500	72.5	62	82	105	137	158	182	207	240	274	303	336	367	396	452	500
	7,500	70.5	62	82	105	137	158	182	207	236	270	297	330	361	390	441	489
	15,000	66.5	61	79	102	132	151	173	196	224	256	282	310	337	360	411	454
9	4,500	72.5	59	77	99	129	148	169	191	223	254	279	309	336	363	412	456
	7,500	70.5	59	77	99	129	148	169	191	218	249	273	302	330	355	401	443
	15,000	66.5	58	74	95	123	140	159	180	206	234	257	284	307	330	371	408

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size, 1,000 Circular Mils 700	750	800	1,000	1,250	1,500	1,750	2,000	Correction Factors for Various Ambient Temperatures 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
3	4,500	72.5	610	632	658	742	838	916	985	1,047	1.09	1.00	.90	.79	...	.65
	7,500	70.5	594	617	640	724	814	884	960	1,016	1.10	1.00	.89	.77	...	.62
	15,000	66.5	566	580	597	674	751	832	884	945	1.11	1.00	.88	.72	...	.54
6	4,500	72.5	546	566	587	660	740	808	866	918	1.09	1.00	.90	.79	...	.65
	7,500	70.5	533	552	572	644	722	780	842	890	1.10	1.00	.89	.77	...	.62
	15,000	66.5	494	510	528	591	658	716	762	803	1.10	1.00	.87	.72	...	.52
9	4,500	72.5	495	514	532	596	668	724	774	820	1.09	1.00	.90	.79	...	.65
	7,500	70.5	473	496	516	579	644	696	750	790	1.10	1.00	.89	.77	...	.61
	15,000	66.5	443	458	471	529	584	634	673	706	1.12	1.00	.86	.70	...	.48

Ratings are based on 60-cycle (see page 285 for footnotes).

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
SINGLE CONDUCTOR (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600
			Conductor Size B. & S. or 1,000 Circular Mils														
50% TO 100% LOAD FACTOR																	
			Amperes per Conductor														
Cables in Air	4,500	72.5	56	73	97	130	153	180	208	244	286	320	360	402	440	512	576
	7,500	70.5	..	72	96	128	151	179	206	239	278	310	348	384	422	492	553
	15,000	66.5	..	..	91	121	142	165	189	218	253	282	315	347	378	438	490
	23,000	61.5	..	..	...	106	124	143	163	188	219	244	272	298	324	375	420

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	700	750	800	1,000	1,250	1,500	1,750	2,000	10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
			Conductor Size, 1,000 Circular Mils								Correction Factors for Various Ambient Temperatures					
Cables in Air	4,500	72.5	636	666	692	795	909	1,020	1,135	1,200	1.39	1.27	1.14	1.00	.92	.83
	7,500	70.5	612	638	664	760	871	976	1,082	1,142	1.42	1.29	1.16	1.00	.91	.82
	15,000	66.5	540	566	589	676	768	853	942	1,001	1.52	1.36	1.20	1.00	.88	.75
	23,000	61.5	462	481	500	568	644	717	776	835	1.68	1.49	1.26	1.00	.83	.62

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the correction factors given.

Ratings include dielectric loss and skin effect, but are based on open-circuited sheath operation, i.e., the sheaths are bonded and grounded at one point only so that there are practically no sheath losses.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
THREE CONDUCTOR TYPE H (Shielded)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
			Conductor Size B. & S. or 1,000 Circular Mils																	Correction Factors for Various Ambient Temperatures					
50% LOAD FACTOR																									
			Amperes per Conductor																						
3	7,500	70.5	59	77	100	132	150	171	196	223	257	283	311	337	360	411	451	489	506	1.10	1.00	.89	.77	...	.62
	15,000	66.5	57	74	96	125	143	163	187	213	243	264	290	315	338	380	414	448	463	1.12	1.00	.87	.71	...	.51
6	7,500	70.5	56	73	95	124	141	160	184	208	240	262	287	312	334	377	414	445	460	1.10	1.00	.89	.76	...	.61
	15,000	66.5	54	70	90	116	133	151	172	195	222	242	265	287	317	344	377	403	415	1.12	1.00	.87	.71	...	.50
9	7,500	70.5	54	70	90	117	133	151	173	195	224	245	268	290	310	348	382	410	422	1.10	1.00	.89	.76	...	.61
	15,000	66.5	52	64	85	108	124	142	161	182	207	225	246	266	283	315	344	368	379	1.12	1.00	.86	.70	...	.48
75% LOAD FACTOR																									
3	7,500	70.5	55	71	92	120	136	155	178	201	231	253	277	300	321	362	398	428	441	1.10	1.00	.89	.77	...	.61
	15,000	66.5	53	68	87	113	128	146	166	188	214	233	255	275	293	329	359	384	396	1.12	1.00	.86	.70	...	.49
6	7,500	70.5	51	66	85	110	124	141	161	181	207	226	246	265	283	318	348	375	386	1.10	1.00	.89	.76	...	.61
	15,000	66.5	49	63	80	103	117	132	149	168	189	205	225	242	257	286	309	330	339	1.12	1.00	.86	.69	...	.45
9	7,500	70.5	47	61	78	102	114	129	147	165	188	204	221	238	255	285	312	333	343	1.10	1.00	.89	.76	...	.60
	15,000	66.5	45	57	72	93	105	118	133	150	169	182	197	212	224	249	268	285	293	1.13	1.00	.85	.67	...	.41

Ratings are based on 60-cycle (see page 287 for footnotes).

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES

THREE CONDUCTOR TYPE H (Shielded)

(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	Correction Factors for Various Ambient Temperatures: 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
100% LOAD FACTOR																									
			Amperes per Conductor																						
3	7,500	70.5	51	66	84	109	123	140	159	180	199	222	244	264	281	315	345	370	380	1.10	1.00	.89	.76	...	.60
	15,000	66.5	48	62	79	102	116	131	148	167	188	203	222	238	252	281	305	325	334	1.12	1.00	.86	.69	...	.45
6	7,500	70.5	46	58	74	96	108	122	139	156	178	194	212	227	242	269	293	314	323	1.10	1.00	.89	.75	...	.60
	15,000	66.5	43	54	69	88	100	112	126	142	159	171	185	198	210	231	249	264	271	1.13	1.00	.85	.66	...	.38
9	7,500	70.5	41	53	68	88	99	111	127	142	160	172	187	200	213	236	256	273	281	1.10	1.00	.88	.75	...	.58
	15,000	66.5	40	49	61	77	87	98	110	124	138	149	159	170	179	197	210	219	223	1.14	1.00	.84	.63	...	.32
50% TO 100% LOAD FACTOR																									
Cables in Air	7,500	70.5	..	68	89	112	129	150	171	197	238	255	286	314	338	383	422	460	479	1.43	1.30	1.15	1.00	.91	.81
	15,000	66.5	..	..	81	103	117	136	155	177	205	228	254	277	298	338	372	404	419	1.58	1.39	1.21	1.00	.88	.74
	23,000	61.5	..	..	..	91	104	119	135	153	176	193	214	233	250	280	307	331	343	1.74	1.53	1.30	1.00	.84	.51

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts, and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the correction factors given.

Ratings include dielectric loss and extra a-c losses, such as sheath loss and proximity loss

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
THREE CONDUCTOR BELTED

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils																	Correction Factors for Various Ambient Temperatures					
			8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
50% LOAD FACTOR																									
			Amperes per Conductor																						
3	4,500	70.5	53	68	91	120	137	156	181	208	239	261	287	313	337	365	426	464	481	1.10	1.00	.89	.77	...	.62
	7,500	67.5	51	67	87	114	131	149	173	197	226	249	272	296	319	363	403	440	456	1.11	1.00	.88	.74	...	.57
	15,000	60.0	48	61	79	104	118	135	154	177	202	224	246	267	286	320	351	380	394	1.14	1.00	.84	.63	...	.32
6	4,500	70.5	51	65	87	114	130	148	171	195	225	245	269	292	314	357	395	429	444	1.10	1.00	.89	.77	...	.62
	7,500	67.5	49	64	83	108	124	141	163	186	212	233	255	277	298	338	373	405	419	1.11	1.00	.88	.74	...	.56
	15,000	60.0	46	59	75	98	111	127	143	164	187	207	228	245	263	292	320	345	355	1.14	1.00	.83	.62	...	.27
9	4,500	70.5	49	63	83	109	124	141	163	185	212	231	253	275	297	335	369	400	419	1.10	1.00	.89	.77	...	.62
	7,500	67.5	47	61	79	103	117	134	154	175	199	219	238	258	278	315	348	377	390	1.11	1.00	.88	.74	...	.56
	15,000	60.0	44	56	71	93	105	120	136	156	177	195	213	229	243	270	293	315	325	1.14	1.00	.83	.62	...	.26
75% LOAD FACTOR																									
3	4,500	70.5	50	64	85	111	127	144	167	190	218	238	261	283	305	345	382	413	428	1.10	1.00	.89	.77	...	.62
	7,500	67.5	48	63	81	106	121	138	159	183	205	226	247	267	288	326	360	390	404	1.11	1.00	.88	.74	...	.57
	15,000	60.0	45	57	73	95	108	123	140	160	182	200	219	237	252	281	307	330	341	1.15	1.00	.83	.61	...	.26
6	4,500	70.5	47	60	79	103	117	133	153	174	199	216	235	256	275	310	340	368	380	1.10	1.00	.89	.77	...	.62
	7,500	67.5	45	59	76	98	112	127	146	166	188	205	222	242	259	291	320	345	357	1.11	1.00	.88	.74	...	.56
	15,000	60.0	41	52	66	87	98	111	126	143	161	174	193	209	222	245	266	285	294	1.15	1.00	.82	.58	...	.08
9	4,500	70.5	44	56	74	96	110	124	142	160	182	198	216	238	250	281	318	333	344	1.10	1.00	.89	.77	...	.62
	7,500	67.5	42	54	70	91	103	117	134	151	170	186	203	220	235	263	278	310	320	1.11	1.00	.88	.73	...	.55
	15,000	60.0	38	48	61	79	89	101	114	128	144	156	172	185	197	215	233	247	253	1.16	1.00	.80	.54	...	...

Ratings are based on 60-cycle (see page 289 for footnotes).

CURRENT CARRYING CAPACITY—VARNISHED CAMBRIC CABLES
THREE CONDUCTOR BELTED
(Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils: 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	Correction Factors for Various Ambient Temperatures: 10°C.	20°C.	30°C.	40°C.	45°C.	50°C.
100% LOAD FACTOR																									
			Amperes per Conductor																						
3	4,500	70.5	47	60	78	102	116	132	152	172	197	215	234	253	272	306	337	365	377	1.10	1.00	.89	.77	...	.62
	7,500	67.5	45	59	76	98	112	126	145	165	186	203	222	240	258	290	317	341	353	1.11	1.00	.88	.74	...	.56
	15,000	60.0	41	52	66	86	97	110	125	141	159	174	192	207	221	244	264	281	290	1.15	1.00	.82	.58	...	.19
6	4,500	70.5	43	54	70	91	103	118	135	153	175	190	207	224	240	268	293	315	325	1.10	1.00	.89	.77	...	.62
	7,500	67.5	41	53	68	88	99	112	128	145	165	180	195	209	224	252	275	297	305	1.11	1.00	.87	.73	...	.54
	15,000	60.0	37	46	58	74	84	94	106	120	134	146	160	173	184	202	216	228	233	1.15	1.00	.80	.51	...	...
9	4,500	70.5	40	51	65	85	95	108	124	139	157	170	185	200	213	239	252	280	288	1.10	1.00	.89	.76	...	.61
	7,500	67.5	35	46	60	79	90	102	116	131	146	159	172	186	198	220	239	256	264	1.11	1.00	.87	.72	...	.53
	15,000	60.0	33	41	51	65	73	83	93	104	116	125	137	147	156	169	179	187	189	1.19	1.00	.77	.42	...	...
50% TO 100% LOAD FACTOR																									
Cables in Air	4,500	70.5	44	52	70	94	110	134	154	179	208	229	255	280	303	345	385	425	442	1.41	1.29	1.15	1.00	.91	.81
	7,500	67.5	..	48	64	84	97	117	139	162	190	212	235	259	280	318	354	390	407	1.48	1.34	1.18	1.00	.90	.78
	15,000	60.0	..	..	59	75	86	100	116	134	155	171	190	206	222	250	276	300	312	1.74	1.53	1.29	1.00	.83	.58

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts, and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the correction factors given.

Ratings include dielectric loss and extra a-c losses, such as sheath loss and proximity loss.

For cables in ducts, all outside ducts are assumed.

For cables in air, ratings are for any load factor from 50% to 100%.

CURRENT CARRYING CAPACITY—RUBBER INSULATED CABLES
SINGLE CONDUCTOR—BRAIDED OR LEADED

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	To = Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000
			Conductor Size B. & S. or 1,000 Circular Mils																		
50% LOAD FACTOR																					
			Amperes per Conductor																		
3	600	75	71	102	131	175	201	237	272	315	368	406	457	503	548	631	708	776	796	837	958
		60	63	86	111	149	172	203	232	269	313	346	388	428	468	537	604	660	687	714	818
6	to	75	71	98	129	168	195	230	264	304	353	390	436	480	523	604	670	734	763	792	902
		60	61	83	110	143	167	197	225	260	304	332	372	408	448	513	573	623	650	675	770
9	5,000	75	69	96	125	164	189	222	256	294	339	375	416	462	503	574	640	698	725	751	855
		60	60	82	107	139	162	190	218	250	289	319	356	393	427	490	545	596	619	641	726
12		75	68	94	123	159	185	216	248	284	327	362	403	443	482	552	608	665	692	718	815
		60	57	80	105	135	158	185	212	242	279	308	343	378	410	471	518	569	592	613	694
75% LOAD FACTOR																					
3	600	75	70	100	126	169	194	226	259	296	343	382	426	471	512	589	655	715	743	771	876
		60	60	86	108	144	166	193	220	252	293	325	364	400	435	501	560	610	634	657	746
6	to	75	68	96	120	162	185	214	245	281	323	357	397	434	473	541	604	755	671	705	800
		60	58	81	103	138	157	183	209	239	276	304	338	371	402	462	514	561	582	603	681
9	5,000	75	65	92	116	154	175	202	230	264	303	336	374	410	442	507	564	610	634	654	737
		60	56	79	98	131	149	173	197	225	259	287	317	349	378	431	480	520	539	557	629
12		75	63	89	111	148	168	194	217	250	288	319	355	386	418	477	525	568	592	612	689
		60	53	76	94	127	143	166	188	214	245	272	302	329	357	405	446	486	504	521	589

Ratings are based on 60-cycle (see page 291 for footnotes).

CURRENT CARRYING CAPACITY—RUBBER INSULATED CABLES
SINGLE CONDUCTOR—BRAIDED OR LEADED (Continued)

Number of Loaded Cables in Duct Bank	Rated Three Phase Line Voltage Volts	To = Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750	800	1,000
			Conductor Size B. & S. or 1,000 Circular Mils																		
100% LOAD FACTOR																					
			Amperes per Conductor																		
3	600	75	68	95	120	160	185	214	243	282	322	357	397	436	476	541	605	658	682	707	801
		60	58	81	103	136	158	183	208	240	275	304	338	372	404	462	515	562	582	604	681
6	to	75	64	88	113	147	173	198	227	258	294	324	361	395	426	488	538	584	608	628	707
		60	54	75	96	126	147	169	194	220	250	277	307	336	363	415	460	498	517	534	604
9	5,000	75	61	82	106	138	161	183	223	241	273	300	332	362	391	445	492	533	551	572	640
		60	51	70	90	118	137	157	191	206	232	256	283	308	333	381	419	453	470	487	545
12		75	58	74	99	129	148	173	196	224	256	281	310	340	365	415	458	493	511	527	594
		60	49	63	85	110	127	147	168	192	218	239	265	290	312	354	389	420	434	448	505
50% TO 100% LOAD FACTOR																					
Cables in Air	600 to 5,000	75	59	80	110	146	174	201	233	272	315	349	395	436	479	555	624	687	718	747	862
		60	44	61	83	111	131	152	177	206	238	265	299	330	362	419	472	519	542	566	650

Ratings are based on 60-cycle alternating current and grounded neutral.
Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other ambient temperatures apply the following correction factors:

Ambient Temp.	Cables in Ducts To=75°C.	Cables in Ducts To=60°C.	Cables in Air To=75°C.	Cables in Air To=60°C.
10°C.	1.09	1.12	1.36	1.58
20°C.	1.00	1.00	1.25	1.41
30°C.	0.90	0.86	1.13	1.22
40°C.	.79	.71	1.00	1.00
50°C.	.68	.50	0.84	0.71

Ratings include skin effect, but not dielectric loss, and are based on open-circuited sheath operation, i.e., sheaths are bonded and grounded at one point only so that there are practically no sheath losses. For cables in ducts, all outside ducts are assumed.
N.B.: These C.C.C.'s not recognized by Cdn. Elect. Code, 1939.

CURRENT CARRYING CAPACITY—RUBBER INSULATED CABLES
THREE CONDUCTOR—BRAIDED OR LEADED

50% LOAD FACTOR

Number of Loaded Cables In Duct Bank	Rated Three Phase Line Voltage Volts	To= Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils 8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
			Amperes per Conductor																
3		75	56	74	99	136	157	175	203	234	268	291	325	355	378	425	464	503	521
	600	60	47	63	85	116	134	149	174	200	228	248	278	302	323	363	396	428	443
6		75	54	69	95	125	147	166	191	220	250	274	291	326	351	394	433	466	478
	to	60	45	58	81	107	126	141	164	189	215	233	258	279	300	336	370	396	407
9		75	52	65	91	118	139	159	182	207	235	258	285	310	332	370	399	431	445
	5,000	60	44	57	78	100	119	135	156	177	201	220	243	265	284	315	340	369	380
12		75	50	62	88	111	132	149	173	196	222	243	262	287	311	348	381	408	420
		60	42	53	75	94	113	128	147	168	190	208	223	245	266	298	326	348	359

75% LOAD FACTOR

Number of Loaded Cables In Duct Bank	Rated Three Phase Line Voltage Volts	To= Max. Copper Temp. °C.	8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
3		75	52	70	93	123	142	162	185	212	242	265	290	313	337	380	416	446	461
	600	60	45	60	79	105	121	138	159	182	207	225	248	268	288	324	356	381	392
6		75	50	65	86	112	130	148	168	191	218	240	264	285	304	341	373	399	409
	to	60	42	56	74	95	111	127	143	164	187	205	225	243	260	292	319	340	349
9		75	46	61	81	104	118	138	156	180	202	221	243	264	281	311	337	361	372
	5,000	60	39	52	69	88	100	118	133	154	173	189	208	225	240	266	291	308	317
12		75	44	57	77	97	111	130	146	168	189	205	223	241	258	287	313	334	343
		60	37	49	66	83	94	111	125	143	162	176	191	206	220	245	268	286	293

Ratings are based on 60-cycle (see page 293 for footnotes).

CURRENT CARRYING CAPACITY—RUBBER INSULATED CABLES THREE CONDUCTOR—BRAIDED OR LEADED (Continued)

Number of Loaded Cables In Duct Bank	Rated Three Phase Line Voltage Volts	To = Max. Copper Temp. °C.	Conductor Size B. & S. or 1,000 Circular Mils																
			8	6	4	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500	600	700	750
100% LOAD FACTOR																			
			Amperes per Conductor																
3	600	75	50	66	86	113	131	148	168	191	218	239	265	287	307	342	371	396	410
		60	42	56	74	96	111	127	143	164	187	205	225	245	263	292	316	338	349
6	to	75	45	59	79	103	116	133	152	170	195	211	232	251	269	295	321	343	353
		60	38	51	67	87	99	114	129	145	167	181	199	215	229	254	274	293	302
9	5,000	75	43	55	72	93	106	122	136	156	175	191	210	225	239	266	287	307	314
		60	36	47	62	81	91	104	117	133	149	164	180	193	205	227	245	262	269
12		75	38	50	68	85	97	113	127	143	161	176	193	207	221	244	264	280	289
		60	32	43	58	73	83	96	108	122	137	150	165	177	189	209	225	239	247
50% TO 100% LOAD FACTOR																			
Cables in Air	600 to 5,000	75	47	64	87	118	134	159	179	206	237	264	295	324	350	395	436	475	493
		60	36	49	66	89	102	119	135	157	180	200	223	248	266	299	330	359	372

Ratings are based on 60-cycle alternating current and grounded neutral.

Ratings are based on ambient earth temperature of 20°C. for cables in ducts and 40°C. ambient air temperature for cables in air. For other anbient temperatures apply the following correction factors:

Ambient Temp.	Cables in Ducts To=75°C.	Cables in Ducts To=60°C.	Cables in Air To=75°C.	Cables in Air To=60°C.
10°C.	1.09	1.12	1.36	1.58
20°C.	1.00	1.00	1.25	1.41
30°C.	0.90	0.86	1.13	1.22
40°C.	.79	.71	1.00	1.00
50°C.	.68	.50	0.84	0.71

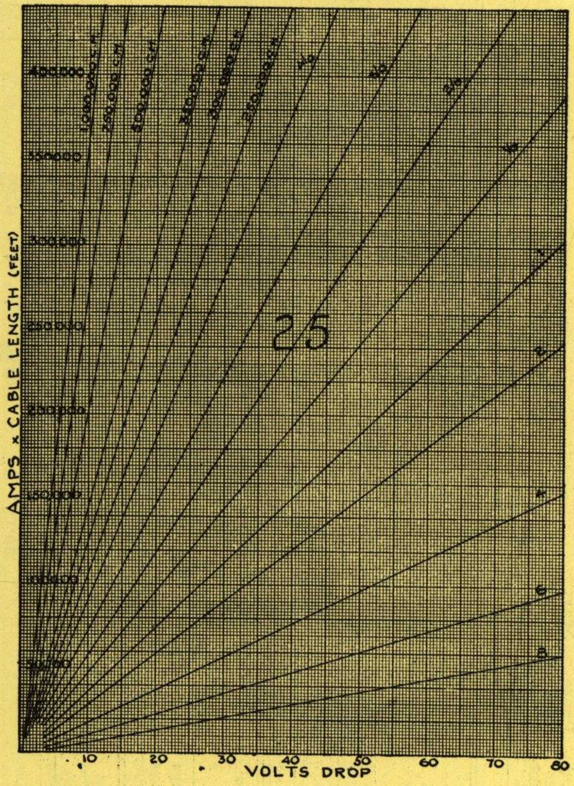
Ratings include extra a-c losses, such as sheath loss and proximity loss, but not dielectric loss.
For cables in ducts, all outside ducts are assumed.
N.B.: These C.C.C.'s not recognized by Cdn. Elect. Code, 1939.

VOLTAGE DROP

The following curves give a convenient method for obtaining the approximate voltage drop on a cable of known length carrying a current at 25 cycles or 60 cycles, 3 phase.

The curves are calculated for cable impedances equivalent to the conductor spacing in three conductor, 600 volt, rubber insulated cables, but they may be used for obtaining the voltage drop in varnished cambric, rubber, or paper insulated cables for voltages up to 5,000 volts with an accuracy sufficient for most practical purposes.

See next page for directions.



How to Use Curves

Multiply the line current by the distance in feet this current is to be transmitted.

Locate the horizontal line equivalent to this figure.

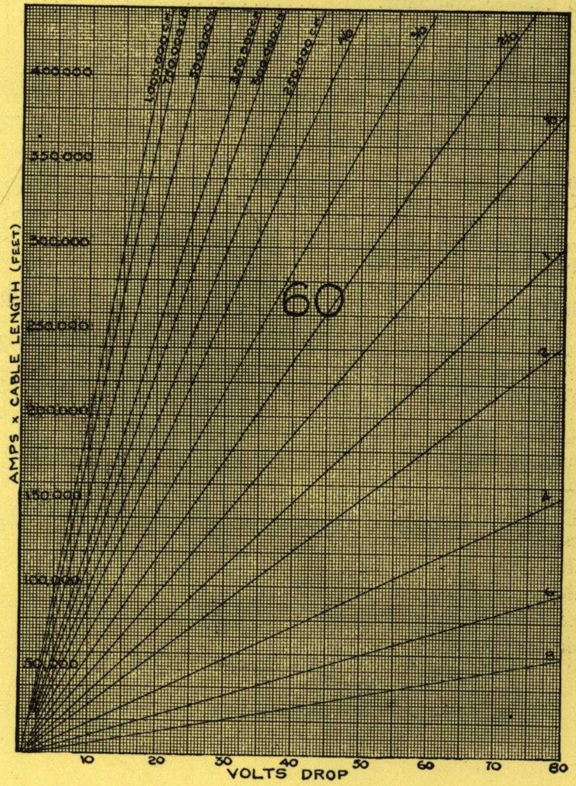
Look along this horizontal line to the point of intersection of the oblique line marked with the size of conductor being used.

From this point of intersection look down to the scale on the bottom horizontal line directly underneath.

The figure thus obtained on this scale will be the voltage drop.

Single Phase—3 Wire Circuits

Proceed as above, and multiply the voltage drop obtained by 1.16.



GENERAL INFORMATION

PROPERTIES OF COPPER

Property	Hard-Drawn Copper Wire	Annealed Copper Wire
Tensile Strength (lb./in.^{2})	49,000 to 67,000 (1)	36,000 to 40,000 (2)
Young's Modulus of Elasticity (lb./in.^{2})	16,000,000 (3)	12,000,000 (3)
Modulus of Torsion (lb./in.^{2})	6,150,000 (3)	....
Proportional Limit (lb./in.^{2})	37,000 (4)	Not determinable
Elongation at Fracture (in 10 inches)	1% to 4% (approx.) (1)	20% to 35% (2)
*Electrical Resistivity — Ohms (Metre, gram) International Annealed Copper Standard.	....	0.15328 (4)
*Electrical Resistivity — Ohms (Mil, foot) International Annealed Copper Standard	....	10.371 (4)

Temperature Coefficient of Resistivity (per deg. C. at 20 deg. C.) 100% Conductivity	0.00393 (4)
Temperature Coefficient of Resistivity (per deg. F. at 68 deg. F.) 100% Conductivity	0.00218
Boiling Point (deg. C.)	2,100 to 2,300 (3)
Coefficient of Linear Expansion (per deg. F.)	0.00000925
Coefficient of Linear Expansion (per deg. C.)	0.00001666 (4)
Specific Thermal Conductivity (calories, per deg. C., per sq. cm., per sec.)	0.918 (4)

* Hard-Drawn Copper has about 2.7% higher resistivity than annealed copper.

(1) A.S.T.M. Spec. B1-27.

(2) A.S.T.M. Spec. B3-27.

(3) N.E.L.A. Underground Systems Reference Book.

(4) Smithsonian Tables.

RESISTIVITY OF COPPER CORRESPONDING TO VARIOUS PER CENT. CONDUCTIVITIES (20°C.)

International Annealed Copper Standard (I.A.C.S.) = 100%
Density: 8.89 grams per cm^3.

Per Cent. Conductivity	Ohms (meter, gram)	Ohms (mile, pound)*	Microhm-cm.	Microhm-inch	Ohms (mil, foot)
100.0	.15328	875.20	1.7241	.67879	10.371
99.9	.15343	876.08	1.7258	.67947	10.381
99.8	.15359	876.95	1.7276	.68015	10.392
99.7	.15374	877.83	1.7293	.68083	10.402
99.6	.15390	878.71	1.7310	.68152	10.413
99.5	.15403	879.60	1.7328	.68220	10.423
99.4	.15421	880.48	1.7345	.68289	10.434
99.3	.15436	881.37	1.7363	.68358	10.444
99.2	.15452	882.26	1.7379	.68426	10.455
99.1	.15467	883.15	1.7398	.68495	10.465
99.0	.15483	884.04	1.7415	.68565	10.476
98.9	.15498	884.93	1.7433	.68634	10.486
98.8	.15514	885.82	1.7450	.68703	10.497
98.7	.15530	886.73	1.7468	.68773	10.508
98.6	.15546	887.63	1.7486	.68843	10.518
98.5	.15561	888.53	1.7504	.68913	10.529
98.4	.15577	889.43	1.7521	.68983	10.540
98.3	.15593	890.34	1.7539	.69053	10.550
98.2	.15609	891.24	1.7557	.69123	10.561
98.16	.15615	891.58	1.7564	.69151	10.565
98.1	.15625	892.15	1.7575	.69194	10.572
98.0	.15641	893.06	1.7593	.69264	10.583
97.9	.15657	893.97	1.7611	.69335	10.593
97.8	.15673	894.89	1.7629	.69406	10.604
97.7	.15689	895.80	1.7647	.69477	10.615
97.66	.15695	896.15	1.7654	.69505	10.619
97.6	.15705	896.72	1.7665	.69548	10.626
97.5	.15721	897.64	1.7683	.69619	10.637
97.4	.15737	898.56	1.7701	.69691	10.648
97.3	.15753	899.49	1.7719	.69763	10.659
97.2	.15770	900.41	1.7738	.69834	10.670
97.16	.15776	900.77	1.7745	.69863	10.674
97.1	.15786	901.34	1.7756	.69906	10.681
97.0	.15792	902.27	1.7774	.69978	10.692
96.9	.15818	903.20	1.7793	.70051	10.703
96.8	.15835	904.13	1.7811	.70123	10.714
96.7	.15851	905.07	1.7829	.70195	10.725
96.66	.15858	905.44	1.7837	.70224	10.729
96.6	.15867	906.0	1.7848	.70268	10.736
96.5	.15884	906.94	1.7866	.70341	10.747

* Numerically equal to pounds per mile-ohm.

RESISTIVITY OF COPPER CORRESPONDING TO VARIOUS PER CENT. CONDUCTIVITIES (20°C.) (Continued)

Per Cent. Conductivity	Ohms (meter, gram)	Ohms (mile, pound)*	Microhm-cm.	Microhm-inch	Ohms (mil, foot)
96.4	.15900	907.88	1.7885	.70414	10.758
96.3	.15917	908.83	1.7903	.70487	10.760
96.2	.15933	909.77	1.7922	.70560	10.781
96.16	.15940	910.15	1.7929	.70590	10.785
96.1	.15949	910.72	1.7941	.70634	10.792
96.0	.15967	911.67	1.7959	.70707	10.803
95.0	.16135	921.26	1.8148	.71452	10.917
94.16	.16279	929.52	1.8310	.72089	11.014
93.15	.16455	939.51	1.8509	.72871	11.134
90.0	.17031	972.44	1.9156	.75421	11.523
85.0	.18033	1,029.65	2.0284	.79858	12.201
80.0	.19160	1,094.00	2.1551	.84849	12.964
75.0	.20437	1,166.93	2.2988	.90505	13.828
70.0	.21897	1,250.29	2.4630	.96970	14.816
65.0	.23582	1,346.46	2.6525	1.04429	15.955
60.0	.25547	1,458.66	2.8735	1.13132	17.285
55.0	.27869	1,591.27	3.0647	1.23416	18.856
50.0	.30656	1,750.40	3.4482	1.35758	20.742
45.0	.34062	1,944.89	3.8313	1.50842	23.047
40.0	.38320	2,188.00	4.3103	1.69698	25.928
39.21	......	....	......	....	26.45
36.27	......	....	......	....	28.59
35.0	.43794	2,500.57	4.9260	1.93940	29.631
30.0	.51093	2,917.33	5.7470	2.26263	34.570
29.41	......	....	......	....	35.26
26.47	......	....	......	....	39.18
15.0	1.0219	5,834.67	11.4940	4.52527	69.14
13.0	1.1791	6,732.31	13.2623	5.22146	79.78

* Numerically equal to pounds per mile-ohm.

The foregoing resistivities are useful in the calculation of 20°C. resistances of conductors having given dimensions and percentage conductivities. In the case of stranded conductors account should, of course, be taken of the increased length due to spiralling of the component wires, by use of the appropriate cabling factor.

COPPER RESISTANCE AT ANY TEMPERATURE

Conductor resistances at any temperature may be determined by the expression:

$$R_t = R_{20}\left[1 + 0.00393\, n\, (t - 20)\right]$$

where R_t = resistance at temperature t, ohms
R_{20} = resistance at 20°C., ohms
n = percentage conductivity, expressed as a decimal
t = new temperature, °C.

For 100% conductivity (n = 1.00) this expression is equivalent to

$$R_t = \frac{234.5 + t}{254.5} R_{20}$$

COPPER CONDUCTOR RESISTANCE CORRECTION FACTORS

The following tabulations give the factor by which the 20°C. resistance of a conductor must be multiplied to obtain its resistance at various other temperatures.

The tabulations are based on copper of 100 per cent. conductivity.

Temp.°C.	20	25	30	35	40	45	50	55	60	65	70	75
Multiplier	1.000	1.020	1.039	1.059	1.079	1.098	1.118	1.138	1.157	1.177	1.197	1.216

Temp. °F.	68	80	90	100	110	120	130	140	150	160
Multiplier	1.000	1.026	1.048	1.070	1.092	1.113	1.135	1.157	1.179	1.201

USEFUL ELECTRICAL FORMULAE FOR DETERMINING AMPERES, HORSE-POWER, KILOWATTS AND KILOVOLT-AMPERES

To Find	Direct Current	Alternating Current		
		Single Phase	Two Phase 4-Wire	Three Phase
Amperes When hp Is Known	$\frac{hp \times 746}{E \times eff}$	$\frac{hp \times 746}{E \times eff \times pf}$	$\frac{hp \times 746}{2 \times E \times eff \times pf}$	$\frac{hp \times 746}{1.73 \times E \times eff \times pf}$
Amperes When kw Is Known	$\frac{kw \times 1{,}000}{E}$	$\frac{kw \times 1{,}000}{E \times pf}$	$\frac{kw \times 1{,}000}{2 \times E \times pf}$	$\frac{kw \times 1{,}000}{1.73 \times E \times pf}$
Amperes When kva Is Known		$\frac{kva \times 1{,}000}{E}$	$\frac{kva \times 1{,}000}{2 \times E}$	$\frac{kva \times 1{,}000}{1.73 \times E}$
Kilowatts	$\frac{I \times E}{1{,}000}$	$\frac{I \times E \times pf}{1{,}000}$	$\frac{I \times E \times 2 \times pf}{1{,}000}$	$\frac{I \times E \times 1.73 \times pf}{1{,}000}$
kva		$\frac{I \times E}{1{,}000}$	$\frac{I \times E \times 2}{1{,}000}$	$\frac{I \times E \times 1.73}{1{,}000}$
hp Output	$\frac{I \times E \times eff}{746}$	$\frac{I \times E \times eff \times pf}{746}$	$\frac{I \times E \times eff \times pf}{746}$	$\frac{I \times E \times 1.73 \times eff \times pf}{746}$

I—Amperes; E—Volts; eff—Efficiency; pf—Power Factor; kw—Kilowatts; kva—Kilovolt-amperes; hp—Horse-Power

COMMON ELECTRICAL TERMS

Ampere	= Unit of current or rate of flow of electricity.
Volt	= Unit of electromotive force.
1 Kilovolt	= 1,000 Volts.
Ohm	= Unit of electrical resistance.
Watt	= Unit of Power.
	= Volts × Amperes (Direct Current).
	= Volts × Amperes × Power Factor (Single Phase).
1 Kilowatt (Kw.)	= 1,000 Watts.
Watt-hour	= Unit of Electrical Energy.
	= Watts × Hours.
1 Kilowatt-hour (Kwh.)	= 1,000 Watt-hours.
Volt-ampere	= a convenient expression used to determine circuit or system capacity and performance (sometimes called "apparent power").
	= Volts × Amperes.
1 Kilovolt-ampere (Kva.)	= 1,000 Volt-amperes.
Coulomb	= Unit of quantity of electricity = quantity which passes a cross section of a conductor in 1 second when the current is 1 ampere.
Mho	= Unit of electrical conductance $= \frac{1}{\text{Ohm.}}$
Henry	= Unit of inductance = inductance of a closed circuit in which an electromotive force of 1 volt is produced when the electric current traversing the circuit varies uniformly at the rate of 1 ampere per second.
Farad	= Unit of electrical capacitance = that capacity whose potential will be raised 1 volt by the addition of a charge of one coulomb. The practical unit is the microfarad which is one millionth of a farad.
Dielectric Constant (of an insulating material)	= Ratio of the capacitance of a condenser having the given material as the dielectric to the capacitance of the same condenser with vacuum as the dielectric.
S.I.C.	= Specific Inductive Capacity = Dielectric Constant = Permittivity.
Dielectric Strength (of an insulating material)	= Maximum voltage or potential gradient that the material can withstand without rupture.
Ohm's Law:—in Direct Current, Amperes	$= \frac{\text{Volts}}{\text{Ohms}}$

TEMPERATURE CONVERSION TABLES

C.		F.	C.		F.	C.		F.
—17.8	**0**	32	18.2	**65**	149.0	188	**370**	698
—17.2	**1**	33.8	18.9	**66**	150.8	193	**380**	716
—16.7	**2**	35.6	19.4	**67**	152.6	199	**390**	734
—16.1	**3**	37.4	20.0	**68**	154.4	204	**400**	752
—15.5	**4**	39.2	20.4	**69**	156.2	210	**410**	770
—15.0	**5**	41.0	21.1	**70**	158.0	215	**420**	788
—14.4	**6**	42.8	21.7	**71**	159.8	221	**430**	806
—13.9	**7**	44.6	22.2	**72**	161.6	226	**440**	824
—13.3	**8**	46.4	22.8	**73**	163.4	232	**450**	842
—12.8	**9**	48.2	23.3	**74**	165.2	238	**460**	860
—12.2	**10**	50.0	23.9	**75**	167.0	243	**470**	878
—11.6	**11**	51.8	24.4	**76**	168.8	249	**480**	896
—11.1	**12**	53.6	25.0	**77**	170.6	254	**490**	914
—10.6	**13**	55.4	25.6	**78**	172.4	260	**500**	932
—10.0	**14**	57.2	26.1	**79**	174.2	265	**510**	950
— 9.4	**15**	59.0	26.6	**80**	176.0	271	**520**	968
— 8.9	**16**	60.8	27.2	**81**	177.8	276	**530**	986
— 8.3	**17**	62.6	27.8	**82**	179.6	282	**540**	1,004
— 7.8	**18**	64.4	28.3	**83**	181.4	288	**550**	1,022
— 7.2	**19**	66.2	28.9	**84**	183.2	293	**560**	1,040
— 6.7	**20**	68.0	29.4	**85**	185.0	299	**570**	1,058
— 6.1	**21**	69.8	29.9	**86**	186.8	304	**580**	1,076
— 5.5	**22**	71.6	30.4	**87**	188.6	310	**590**	1,094
— 5.0	**23**	73.4	31.0	**88**	190.4	315	**600**	1,112
— 4.4	**24**	75.2	31.6	**89**	192.2	321	**610**	1,130
— 3.9	**25**	77.0	32.2	**90**	194.0	326	**620**	1,148
— 3.3	**26**	78.8	32.6	**91**	195.8	332	**630**	1,166
— 2.8	**27**	80.6	33.3	**92**	197.6	338	**640**	1,184
— 2.2	**28**	82.4	33.8	**93**	199.4	343	**650**	1,202
— 1.7	**29**	84.2	34.4	**94**	201.2	349	**660**	1,220
— 1.1	**30**	86.0	35.0	**95**	203.0	354	**670**	1,238
— .6	**31**	87.8	35.5	**96**	204.8	360	**680**	1,256
0	**32**	89.6	36.1	**97**	206.6	365	**690**	1,274
.6	**33**	91.4	36.6	**98**	208.4	371	**700**	1,292
1.1	**34**	93.2	37.2	**99**	210.2	376	**710**	1,310
1.7	**35**	95.0	37.8	**100**	212.0	382	**720**	1,328
2.2	**36**	96.8	37.8	**100**	212	387	**730**	1,346
2.8	**37**	98.6	43.3	**110**	230	393	**740**	1,364
3.3	**38**	100.4	48.9	**120**	248	399	**750**	1,382
3.9	**39**	102.2	54.4	**130**	266	404	**760**	1,400
4.4	**40**	104.0	60	**140**	284	410	**770**	1,418
4.9	**41**	105.8	65.6	**150**	302	415	**780**	1,436
5.6	**42**	107.6	71	**160**	320	421	**790**	1,454
6.1	**43**	109.4	76.7	**170**	338	426	**800**	1,472
6.7	**44**	111.2	82.2	**180**	356	432	**810**	1,490
7.2	**45**	113.0	87	**190**	374	438	**820**	1,508
7.8	**46**	114.8	93.3	**200**	392	443	**830**	1,526
8.3	**47**	116.6	98.9	**210**	410	449	**840**	1,544
8.9	**48**	118.4	100	**212**	413	454	**850**	1,562
9.4	**49**	120.2	104	**220**	428	460	**860**	1,580
10.0	**50**	122.0	110	**230**	446	465	**870**	1,598
10.6	**51**	123.8	115	**240**	464	471	**880**	1,616
11.1	**52**	125.6	121	**250**	482	476	**890**	1,634
11.7	**53**	127.4	127	**260**	500	482	**900**	1,652
12.2	**54**	129.2	132	**270**	518	487	**910**	1,670
12.8	**55**	131.0	138	**280**	536	493	**920**	1,688
13.3	**56**	132.8	143	**290**	554	498	**930**	1,706
13.7	**57**	134.6	149	**300**	572	504	**940**	1,724
14.4	**58**	136.4	154	**310**	590	510	**950**	1,742
15.0	**59**	138.2	160	**320**	608	515	**960**	1,760
15.6	**60**	140.0	165	**330**	626	520	**970**	1,778
16.1	**61**	141.8	171	**340**	644	526	**980**	1,796
16.7	**62**	143.6	177	**350**	662	532	**990**	1,814
17.2	**63**	145.4	182	**360**	680	538	**1,000**	1,832
17.8	**64**	147.2						

Note: The numbers in BLACK FACE refer to the temperature either in degrees Centigrade or Fahrenheit which it is desired to convert into the other scale.

PROPERTIES OF METALS (20°C.)

	Symbol	Atomic Weight	Specific Gravity	Specific Heat Cal./Gram/Deg. C.	Melting Point Deg. C.
Copper:					
Annealed Wire (100% cond.)	Cu	63.57	8.89	.0921	1,083
Hard Drawn Wire (97.5% cond.)	......	......	8.89	.....	......
Brass, Hard Drawn Wire:					
Com'l. Bronze (90% Cu, 10% Zn)	......	......	8.80	.092	1,045
Low Brass (80% Cu, 20% Zn)	......	......	8.67	.092	995
High Brass (70% Cu, 30% Zn)	......	......	8.53	.092	930
Bronze, Hard Drawn Wire:					
Aluminum (96.25% Cu, 3% Al, 0.75% Si)	......	......	8.54	.09	1,021
Tin (98.2% Cu, 1.8% Sn)	......	......	8.89	.09	1,021
Cadmium (99% Cu, 1% Cd)	......	......	8.89	.09	949
Phosphor (95% Cu, 5% Sn)	......	......	8.89	.09	932
Aluminum	Al	26.97	2.71	.214	660
Iron	Fe	55.84	7.9	.107	1,535
Lead	Pb	207.22	11.3	.031	327
Nickel	Ni	58.69	8.9	.105	1,452
Silver	Ag	107.88	10.5	.056	961
Steel (mild)	......	......	7.8	.107	1,300-1,475
Tin	Sn	118.70	7.3	.054	232
Zinc	Zn	65.38	7.1	.092	419

	Resistivity Microhm-Cm. Units	Temperature Coefficient of Resistance per Deg. C.	Thermal Conductivity Cal./Cm.^{2}/Cm./Sec./Deg. C.*	Linear Coefficient of Expansion per Deg. C.†	Tensile Strength Lbs. per Sq. Inch
Copper:					
Annealed Wire (100% cond.)	1.7241	.00393	.92	17×10^{-6}	36,000-40,000
Hard Drawn Wire (97.5% cond.)	1.7683	.00383	.....	....	50,000-70,000
Brass, Hard Drawn Wire:					
Com'l. Bronze (90% Cu, 10% Zn)	4.66	.00145	.45	18×10^{-6}	95,000
Low Brass (80% Cu, 20% Zn)	5.95	.00114	.34	19×10^{-6}	105,000
High Brass (70% Cu, 30% Zn)	6.90	.00098	.26	20×10^{-6}	120,000
Bronze, Hard Drawn Wire:					
Aluminum (96.25% Cu, 3% Al, 0.75% Si)	11.49	.00059	.170	17×10^{-6}	125,000
Tin (98.2% Cu, 1.8% Sn)	5.75	.00118	.395	17×10^{-6}	95,000
Cadmium (99% Cu, 1% Cd)	2.16	.00314	.824	17×10^{-6}	79,000
Phosphor (95% Cu, 5% Sn)	9.56	.00071	.195	18×10^{-6}	125,000
Aluminum	2.828	.00403	.52	23×10^{-6}	24,000
Iron	10.0	.005	.16	12×10^{-6}	50,000
Lead	22.0	.0039	.083	28×10^{-6}	1,800-4,000
Nickel	7.8	.006	.14	14×10^{-6}	155,000
Silver	1.63	.0038	1.01	18×10^{-6}	42,000
Steel (mild)	12.0	.005	0.11	9×10^{-6}	50,000-70,000
Tin	11.5	.0042	.15	21×10^{-6}	4,000-5,000
Zinc	6.0	.0037	.27	28×10^{-6}	7,000-30,000

* Multiply by 4.186 to obtain conductivity in Watts/Cm.^{2}/Cm./Deg. C.

† Multiply by 5/9 to obtain coefficient per Deg. F.

PROPERTIES OF INSULATING MATERIALS (20°C.)

	Specific Gravity	Specific Heat Cal./ Gram/ Deg. C.	Thermal Resistivity Deg. C./ Watt/ Cm.^{2}/Cm. (Thermal Ohms)	Dielectric Constant	Electrical Volume Resistivity Ohm-Cm.
Air	0.0012	0.237	4,000	1.00	.....
Asphalt (native)	1.05	.....	140	2.7	6×10^{14}
Bakelite (pure resin)	1.25	.....	700	4.5 - 7.5	2×10^{16}
Beeswax	0.96	.....	2,900	2.9	$5 \times 10^{14} - 2 \times 10^{15}$
Celluloid (clear)	1.5	.....	600	7.0	2×10^{10}
Concrete	1.8 - 2.5	0.16	50-100	.....	.....
Cork	0.24	0.49	1,800	.....	.....
Cotton (dry)	.....	0.36	.....	3.5	1×10^{9}
Enamel (wire)	.....	.....	.....	5.0	1×10^{14}
Glass (elect.)	2.3	0.20	100	5.0	1×10^{14}
Impregnated Paper	1.17	.....	550-700	3.7 - 4.0	$2 \times 10^{14} - 1 \times 10^{16}$
Impregnating Oil	0.90	.....	700	2.2	2×10^{13}
Mica	2.9	0.21	280	4.5 - 7.5	$1 \times 10^{15} - 2 \times 10^{17}$
Paraffin	0.90	0.45	400	2.1	$1 \times 10^{16} - 5 \times 10^{18}$
Porcelain (elect.)	2.4	0.26	100	5.7	$1 \times 10^{14} - 3 \times 10^{14}$
Rubber:					
Smoked Sheet	0.92	0.48	500	2.6	.....
Code Compound	1.40	.....	500	6.0	3.1×10^{14}
Performance Compound	1.40	.....	500	5.0	1.75×10^{15}
Thermax Compound	1.65	.....	400	5.0	1.75×10^{15}
Varnished Cloth (black)	1.25	.....	600	5.0	3×10^{14}
Water	1.00	1.00	170	80.0	.....
Wood (maple)	0.68	.....	550	4.4	5×10^{11}

In presenting the above tables of properties of metals and insulating materials the intention is to show average or representative values for purposes of comparison and for use in engineering calculations not requiring a high order of accuracy. Depending on the material in question, properties may vary considerably with such characteristics as composition, purity, grain structure, size of sample, temperature, moisture content, previous mechanical and thermal treatment, method of test, etc. In condensed tables of this sort it is impracticable to show the effect of these variables, but in work requiring precision they should, of course, be taken into account. When the exact nature of the material is known, accurate data can usually be found in such reference works as the International Critical Tables or the Smithsonian Physical Tables, as well as in various engineering handbooks.

CONVERSION FACTORS

MULTIPLY THE NUMBER OF	BY	TO OBTAIN THE NUMBER OF
Length		
Mils	.001	Inches
Mils	.02540	Millimeters
Inches	1,000.0	Mils
Inches	25.40	Millimeters
Inches	2.540	Centimeters
Inches	0.02540	Meters
Feet	30.48	Centimeters
Feet	0.3048	Meters
Feet (Thousands of)	.3048	Kilometers
Yards	.9144	Meters
Miles	1.6093	Kilometers
Millimeters	39.37	Mils
Millimeters	0.03937	Inches
Centimeters	.3937	Inches
Centimeters	.03281	Feet
Meters	39.37	Inches
Meters	3.281	Feet
Meters	1.0936	Yards
Kilometers	3.281	Thousands of Feet
Kilometers	0.6214	Miles
Area		
Square Mils	1.2732	Circular Mils
Square Mils	0.000001	Square Inches
Circular Mils	.7854	Square Mils
Circular Mils	.0000007854	Square Inches
Circular Mils	.000001	Circular Inches
Circular Mils	.0005067	Square Millimeters
Square Inches	1,000,000.0	Square Mils
Square Inches	1,273,200.0	Circular Mils
Square Inches	1.2732	Circular Inches
Square Inches	645.2	Square Millimeters
Square Inches	6.452	Square Centimeters
Circular Inches	1,000,000.0	Circular Mils
Circular Inches	0.7854	Square Inches
Square Feet	.09290	Square Meters
Square Millimeters	1,973.5	Circular Mils
Square Millimeters	0.0015500	Square Inches
Square Centimeters	.15500	Square Inches
Square Meters	10.764	Square Feet
Volume		
Cubic Inches	16.387	Cubic Centimeters
Cubic Feet	0.02832	Cubic Meters
Cubic Centimeters	.06102	Cubic Inches
Cubic Meters	35.31	Cubic Feet
Quarts (liquid)	0.9464	Liters
Liters	1.0567	Quarts (liquid)

CONVERSION FACTORS

MULTIPLY THE NUMBER OF	BY	TO OBTAIN THE NUMBER OF
Miscellaneous		
Pounds	.4536	Kilograms
Pounds per Cubic Inch	27.68	Grams per Cubic Centimeter
Pounds per 1,000 Feet	1.488	Kilograms per Kilometer
Grams per Cubic Centimeter	0.03613	Pounds per Cubic Inch
Kilograms	2.2046	Pounds
Kilograms per Kilometer	0.6720	Pounds per 1,000 Feet
Ohms per 1,000 Feet	3.281	Ohms per Kilometer
Ohms per Kilometer	0.3048	Ohms per 1,000 Feet
Energy		
British Thermal Units	778.0	Foot-Pounds
British Thermal Units	1054.8	Joules
British Thermal Units	0.2930	Watt-Hours
British Thermal Units	.0003929	Horsepower-Hours
British Thermal Units	252.0	Gram-Calories
Foot-Pounds	0.001285	British Thermal Units
Foot-Pounds	1.356	Joules
Foot-Pounds	0.0003766	Watt-Hours
Foot-Pounds	.1383	Meter-Kilograms
Watt-Hours	3.413	British Thermal Units
Watt-Hours	2,655.0	Foot-Pounds
Watt-Hours	3,600.0	Joules
Joules	0.000948	British Thermal Units
Joules	.7376	Foot-Pounds
Joules	.0002778	Watt-Hours
Joules	10,000,000.0	Ergs
Joules	0.2389	Gram-Calories
Gram-Calories	.003969	British Thermal Units
Gram-Calories	4.186	Joules
Meter-Kilograms	7.233	Foot-Pounds
Horsepower-Hours	2,545.0	British Thermal Units
Power		
Horsepower	550.0	Foot-Pounds per Second
Horsepower	33,000.0	Foot-Pounds per Minute
Horsepower	0.7457	Kilowatts
Horsepower	1.014	Metric Horsepower
Foot-Pounds per Second	0.001818	Horsepower
Foot-Pounds per Minute	.00003030	Horsepower
Kilowatts	1.341	Horsepower
Kilowatts	1.360	Metric Horsepower
Metric Horsepower	0.9863	Horsepower
Metric Horsepower	.7355	Kilowatts

Note: Mean calories and mean British thermal units used throughout. Joule is "absolute" Joule.

CONVERSION FACTORS

MULTIPLY THE NUMBER OF	BY	TO OBTAIN THE NUMBER OF
Pressure		
Feet of Water	0.433	Pounds per Square Inch
Feet of Water	62.4	Pounds per Square Foot
Inches of Mercury	1.134	Feet of Water
Inches of Mercury	0.4912	Pounds per Square Inch.
Atmospheres	14.697	Pounds per Square Inch
Atmospheres	33.9	Feet of Water
Pounds per Square Foot	4.8824	Kilograms per Square Meter
Pounds per Square Inch	0.07031	Kilograms per Square Centimeter
Kilograms per Square Centimeter	32.8	Feet of Water
Kilograms per Square Centimeter	14.223	Pounds per Square Inch
Discharge		
Cubic Feet per Second	374.08	Imperial Gallons per Minute
Cubic Feet per Second	448.9	U.S. Gallons per Minute
Cubic Feet per Second	1.9835	Acre-Feet per Day
Cubic Centimeters per Second	0.79	Imperial Gallons per Hour
Cubic Centimeters per Second	0.95	U.S. Gallons per Hour
Inches of Rainfall per Hour	1.008	Cubic Feet per Second per Acre
Velocity		
Radians per Second	9.5496	Revolutions per Minute
Revolutions per Minute	6.000	Degrees per Second
Feet per Second	0.6818	Miles per Hour
Miles per Hour	88.0	Feet per Minute

METRIC MEASURE

1 kilometer	=	1,000 meters
1 meter	=	10 decimeters
	=	100 centimeters
	=	1,000 millimeters
	=	1,000,000 microns
	=	10,000,000,000 Angstrom units

LAND MEASURE

1 mile = 5,280 feet = 1,760 yards = 320 rods = 80 chains = 8 furlongs
1 furlong = 660 feet = 220 yards = 40 rods = 10 chains
1 chain = 66 feet = 22 yards = 4 rods = 100 links
1 rod = 16.5 feet = 5.5 yards = 25 links
1 link = 7.92 inches
1 square mile = 640 acres
1 acre = 160 square rods = 10 square chains
1 square rod = 272.25 square feet = 30.25 square yards

NAUTICAL MEASURE

1 nautical mile = length of a minute of longitude of the earth at the equator = 6080.20 feet = 1.15155 statute or land miles
1 knot = 1 nautical mile per hour
1 league (U.S.) = 3 nautical miles   1 league (Gr. Britain) = 3 statute miles
1 fathom = 6 feet
1 cable length = 120 fathoms

LIQUID MEASURE

1 hogshead = 2 barrels
1 barrel = $31\frac{1}{2}$ gallons
1 gallon = 4 quarts = 8 pints = 231 cubic inches
1 quart = 2 pints

MISCELLANEOUS CONSTANTS

$\pi = 3.14159$ $\frac{1}{\pi} = 0.31831$ $\frac{\pi}{4} = 0.785398$

$\pi^2 = 9.8696$ $\sqrt{\pi} = 1.77245$ $\log_{10}\pi = 0.49715$

$e = 2.71828$ $\log_{10}X = 0.43429 \log_e X$ $\log_e X = 2.3026 \log_{10} X$

$\sqrt{2} = 1.41421$ $\sqrt{3} = 1.73205$

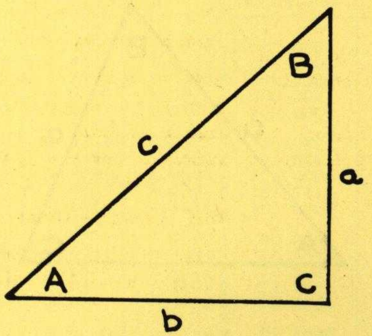
1 radian = 57.296 deg. = 57° 17′ 45″
Absolute zero = − 273.1°C. = − 459.6°F.
Acceleration of gravity (Lat. 40°, sea level) = 980.2 cm. per sec.^{2} = 32.2 ft. per sec.^{2}
Velocity of sound in dry air at 0°C. = 33,170 cm. per sec. = 1,088 ft. per sec.
Velocity of light in vacuum = 2.998×10^{10} cm. per sec. = 186,300 miles per sec.

MENSURATION FORMULAE

Triangle	Area	$= \frac{1}{2}$ (base) $\times$ (altitude)
Parallelogram	Area	$=$ (base) $\times$ (altitude)
Trapezoid	Area	$=$ ($\frac{1}{2}$ sum of parallel sides) $\times$ (altitude)
Circle	Circumference	$=$ (3.1416) $\times$ (diameter) $=$ (6.2832) $\times$ (radius)
	Area	$=$ (0.7854) $\times$ (diameter)^2 $=$ (3.1416) $\times$ (radius)^2
	Area of Sector	$= \frac{1}{2}$ (radius) $\times$ (arc)
	Area of Segment	$= \frac{1}{2}$ (radius) $\times$ (arc) $- \frac{1}{2}$ (radius) $\times$ (chord) $+ \frac{1}{2}$ (chord) $\times$ (height)
Ellipse	Area	$=$ (0.7854) $\times$ (short diameter) $\times$ (long diameter)
Cylinder	Surface	$=$ (length) $\times$ (circumference) $+$ (area of ends)
	Volume	$=$ (0.7854) $\times$ (length) $\times$ (diameter)^2
Cone	Surface (curved only)	$= \frac{1}{2}$ (slant height) $\times$ (circumference of base)
	Volume	$= \frac{1}{3}$ (area of base) $\times$ (height)
Sphere	Surface	$=$ (3.1416) $\times$ (diameter)^2 $=$ (circumference) $\times$ (diameter)
	Volume	$=$ (0.5236) $\times$ (diameter)^3 $= \frac{1}{6}$ (circumference) $\times$ (diameter)^2
		$= \frac{2}{3}$ (volume of circumscribing cylinder)

SOLUTION OF TRIANGLES

Right-angled Triangles



$\sin A = \frac{a}{c}$ $\qquad$ $\cot A = \frac{b}{a}$

$\cos A = \frac{b}{c}$ $\qquad$ $\sec A = \frac{c}{b}$

$\tan A = \frac{a}{b}$ $\qquad$ $\operatorname{cosec} A = \frac{c}{a}$

To find sides:

$$a = \sqrt{c^2 - b^2} = c \sin A = b \tan A$$

$$b = \sqrt{c^2 - a^2} = a \cot A = c \cos A$$

$$c = \sqrt{a^2 + b^2} = a \operatorname{cosec} A = \frac{a}{\sin A} = b \sec A = \frac{b}{\cos A}$$

To find angles:

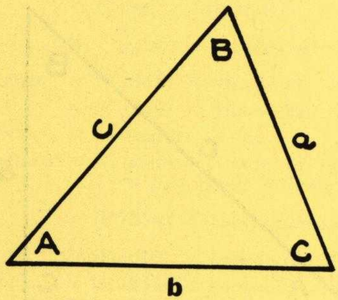
$$A:\ \sin A = \frac{a}{c} \quad \text{or} \quad \tan A = \frac{a}{b}$$

$$B = 90° - A$$

$$\text{Area} = \frac{a\sqrt{c^2 - a^2}}{2} = \frac{ab}{2} = \frac{a^2 \cot A}{2} = \frac{b^2 \tan A}{2} = \frac{c^2 \sin A \cos A}{2}$$

SOLUTION OF TRIANGLES

Oblique-angled Triangles



To find any side, c:

$$c = \frac{a \sin C}{\sin A} = \frac{b \sin C}{\sin B} = \frac{a}{\cos B + \sin B \cot A} = \frac{b}{\cos A + \sin A \cot C}$$

$$= a.\ \cos B. + a.\ \sin B.\ \cot A = b \cos A + b \sin A.\ \cot B =$$

$$\sqrt{a^2 + b^2 - 2\,a\,b \cos C}$$

To find any angle, A:

$$\sin\ A = \frac{a \sin C}{c} = \frac{a \sin B.}{b}$$

$$\cos\ A = \frac{c^2 + b^2 - a^2}{2\,c\,b}$$

$$\tan\ A = \frac{a \sin C}{b - a \cos C} = \frac{a \sin b}{c - a \cos B} = \frac{\tan C + \tan B.}{\tan C \tan B - 1}$$

$$\text{Area} = \frac{b.\ c.\ \sin A}{2} = \frac{a.\ b.\ \sin C}{2} = \frac{c.\ a.\ \sin B}{2}$$

$$= \sqrt{s\,(s - a)\,(s - b)\,(s - c)} \quad \text{where } s = \frac{a + b + c}{2}$$

FUNCTIONS OF NUMBERS, 1 to 49

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
1	1	1	1.0000	1.0000	1000.000	3.142	0.7854
2	4	8	1.4142	1.2599	500.000	6.283	3.1416
3	9	27	1.7321	1.4422	333.333	9.425	7.0686
4	16	64	2.0000	1.5874	250.000	12.566	12.5664
5	25	125	2.2361	1.7100	200.000	15.708	19.6350
6	36	216	2.4495	1.8171	166.667	18.850	28.2743
7	49	343	2.6458	1.9129	142.857	21.991	38.4845
8	64	512	2.8284	2.0000	125.000	25.133	50.2655
9	81	729	3.0000	2.0801	111.111	28.274	63.6173
10	100	1000	3.1623	2.1544	100.000	31.416	78.5398
11	121	1331	3.3166	2.2240	90.9091	34.558	95.0332
12	144	1728	3.4641	2.2894	83.3333	37.699	113.097
13	169	2197	3.6056	2.3513	76.9231	40.841	132.732
14	196	2744	3.7417	2.4101	71.4286	43.982	153.938
15	225	3375	3.8730	2.4662	66.6667	47.124	176.715
16	256	4096	4.0000	2.5198	62.5000	50.265	201.062
17	289	4913	4.1231	2.5713	58.8235	53.407	226.980
18	324	5832	4.2426	2.6207	55.5556	56.549	254.469
19	361	6859	4.3589	2.6684	52.6316	59.690	283.529
20	400	8000	4.4721	2.7144	50.0000	62.832	314.159
21	441	9261	4.5826	2.7589	47.6190	65.973	346.361
22	484	10648	4.6904	2.8020	45.4545	69.115	380.133
23	529	12167	4.7958	2.8439	43.4783	72.257	415.476
24	576	13824	4.8990	2.8845	41.6667	75.398	452.389
25	625	15625	5.0000	2.9240	40.0000	78.540	490.874
26	676	17576	5.0990	2.9625	38.4615	81.681	530.929
27	729	19683	5.1962	3.0000	37.0370	84.823	572.555
28	784	21952	5.2915	3.0366	35.7143	87.965	615.752
29	841	24389	5.3852	3.0723	34.4828	91.106	660.520
30	900	27000	5.4772	3.1072	33.3333	94.248	706.858
31	961	29791	5.5678	3.1414	32.2581	97.389	754.768
32	1024	32768	5.6569	3.1748	31.2500	100.531	804.248
33	1089	35937	5.7446	3.2075	30.3030	103.673	855.299
34	1156	39304	5.8310	3.2396	29.4118	106.814	907.920
35	1225	42875	5.9161	3.2711	28.5714	109.956	962.113
36	1296	46656	6.0000	3.3019	27.7778	113.097	1017.88
37	1369	50653	6.0828	3.3322	27.0270	116.239	1075.21
38	1444	54872	6.1644	3.3620	26.3158	119.381	1134.11
39	1521	59319	6.2450	3.3912	25.6410	122.522	1194.59
40	1600	64000	6.3246	3.4200	25.0000	125.66	1256.64
41	1681	68921	6.4031	3.4482	24.3902	128.81	1320.25
42	1764	74088	6.4807	3.4760	23.8095	131.95	1385.44
43	1849	79507	6.5574	3.5034	23.2558	135.09	1452.20
44	1936	85184	6.6332	3.5303	22.7273	138.23	1520.53
45	2025	91125	6.7082	3.5569	22.2222	141.37	1590.43
46	2116	97336	6.7823	3.5830	21.7391	144.51	1661.90
47	2209	103823	6.8557	3.6088	21.2766	147.65	1734.94
48	2304	110592	6.9282	3.6342	20.8333	150.80	1809.56
49	2401	117649	7.0000	3.6593	20.4082	153.94	1885.74

FUNCTIONS OF NUMBERS, 50 to 99

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter Circum.	No. = Diameter Area
50	2500	125000	7.0711	3.6840	20.0000	157.08	1963.50
51	2601	132651	7.1414	3.7C84	19.6078	160.22	2042.82
52	2704	140608	7.2111	3.7325	19.2308	163.36	2123.72
53	2809	148877	7.2801	3.7563	18.8679	166.50	2206.18
54	2916	157464	7.3485	3.7798	18.5185	169.65	2290.22
55	3025	166375	7.4162	3.8030	18.1818	172.79	2375.83
56	3136	175616	7.4833	3.8259	17.8571	175.93	2463.01
57	3249	185193	7.5498	3.8485	17.5439	179.07	2551.76
58	3364	195112	7.6158	3.8709	17.2414	182.21	2642.08
59	3481	205379	7.6811	3.8930	16.9492	185.35	2733.97
60	3600	216000	7.7460	3.9149	16.6667	188.50	2827.43
61	3721	226981	7.8102	3.9365	16.3934	191.64	2922.47
62	3844	238328	7.8740	3.9579	16.1290	194.78	3019.07
63	3969	250047	7.9373	3.9791	15.8730	197.92	3117.25
64	4096	262144	8.0000	4.0000	15.6250	201.06	3216.99
65	4225	274625	8.0623	4.0207	15.3846	204.20	3318.31
66	4356	287496	8.1240	4.0412	15.1515	207.35	3421.19
67	4489	300763	8.1854	4.0615	14.9254	210.49	3525.65
68	4624	314432	8.2462	4.0817	14.7059	213.63	3631.68
69	4761	328509	8.3066	4.1016	14.4928	216.77	3739.28
70	4900	343000	8.3666	4.1213	14.2857	219.91	3848.45
71	5041	357911	8.4261	4.1408	14.0845	223.05	3959.19
72	5184	373248	8.4853	4.1602	13.8889	226.19	4071.50
73	5329	389017	8.5440	4.1793	13.6986	229.34	4185.39
74	5476	405224	8.6023	4.1983	13.5135	232.48	4300.84
75	5625	421875	8.6603	4.2172	13.3333	235.62	4417.86
76	5776	438976	8.7178	4.2358	13.1579	238.76	4536.46
77	5929	456533	8.7750	4.2543	12.9870	241.90	4656.63
78	6084	474552	8.8318	4.2727	12.8205	245.04	4778.36
79	6241	493039	8.8882	4.2908	12.6582	248.19	4901.67
80	6400	512000	8.9443	4.3089	12.5000	251.33	5026.55
81	6561	531441	9.0000	4.3267	12.3457	254.47	5153.00
82	6724	551368	9.0554	4.3445	12.1951	257.61	5281.02
83	6889	571787	9.1104	4.3621	12.0482	260.75	5410.61
84	7056	592704	9.1652	4.3795	11.9048	263.89	5541.77
85	7225	614125	9.2195	4.3968	11.7647	267.04	5674.50
86	7396	636056	9.2736	4.4140	11.6279	270.18	5808.80
87	7569	658503	9.3274	4.4310	11.4943	273.32	5944.68
88	7744	681472	9.3808	4.4480	11.3636	276.46	6082.12
89	7921	704969	9.4340	4.4647	11.2360	279.60	6221.14
90	8100	729000	9.4868	4.4814	11.1111	282.74	6361.73
91	8281	753571	9.5394	4.4979	10.9890	285.88	6503.88
92	8464	778688	9.5917	4.5144	10.8696	289.03	6647.61
93	8649	804357	9.6437	4.5307	10.7527	292.17	6792.91
94	8836	830584	9.6954	4.5468	10.6383	295.31	6939.78
95	9025	857375	9.7468	4.5629	10.5263	298.45	7088.22
96	9216	884736	9.7980	4.5789	10.4167	301.59	7238.23
97	9409	912673	9.8489	4.5947	10.3093	304.73	7389.81
98	9604	941192	9.8995	4.6104	10.2041	307.88	7542.96
99	9801	970299	9.9499	4.6261	10.1010	311.02	7697.69

FUNCTIONS OF NUMBERS, 100 to 149

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
100	10000	1000000	10.0000	4.6416	10.00000	314.16	7853.98
101	10201	1030301	10.0499	4.6570	9.90099	317.30	8011.85
102	10404	1061208	10.0995	4.6723	9.80392	320.44	8171.28
103	10609	1092727	10.1489	4.6875	9.70874	323.58	8332.29
104	10816	1124864	10.1980	4.7027	9.61538	326.73	8494.87
105	11025	1157625	10.2470	4.7177	9.52381	329.87	8659.01
106	11236	1191016	10.2956	4.7326	9.43396	333.01	8824.73
107	11449	1225043	10.3441	4.7475	9.34579	336.15	8992.02
108	11664	1259712	10.3923	4.7622	9.25926	339.29	9160.88
109	11881	1295029	10.4403	4.7769	9.17431	342.43	9331.32
110	12100	1331000	10.4881	4.7914	9.09091	345.58	9503.32
111	12321	1367631	10.5357	4.8059	9.00901	348.72	9676.89
112	12544	1404928	10.5830	4.8203	8.92857	351.86	9852.03
113	12769	1442897	10.6301	4.8346	8.84956	355.00	10028.7
114	12996	1481544	10.6771	4.8488	8.77193	358.14	10207.0
115	13225	1520875	10.7238	4.8629	8.69565	361.28	10386.9
116	13456	1560896	10.7703	4.8770	8.62069	364.42	10568.3
117	13689	1601613	10.8167	4.8910	8.54701	367.57	10751.3
118	13924	1643032	10.8628	4.9049	8.47458	370.71	10935.9
119	14161	1685159	10.9087	4.9187	8.40336	373.85	11122.0
120	14400	1728000	10.9545	4.9324	8.33333	376.99	11309.7
121	14641	1771561	11.0000	4.9461	8.26446	380.13	11499.0
122	14884	1815848	11.0454	4.9597	8.19672	383.27	11689.9
123	15129	1860867	11.0905	4.9732	8.13008	386.42	11882.3
124	15376	1906624	11.1355	4.9866	8.06452	389.56	12076.3
125	15625	1953125	11.1803	5.0000	8.00000	392.70	12271.8
126	15876	2000376	11.2250	5.0133	7.93651	395.84	12469.0
127	16129	2048383	11.2694	5.0265	7.87402	398.98	12667.7
128	16384	2097152	11.3137	5.0397	7.81250	402.12	12868.0
129	16641	2146689	11.3578	5.0528	7.75194	405.27	13069.8
130	16900	2197000	11.4018	5.0658	7.69231	408.41	13273.2
131	17161	2248091	11.4455	5.0788	7.63359	411.55	13478.2
132	17424	2299968	11.4891	5.0916	7.57576	414.69	13684.8
133	17689	2352637	11.5326	5.1045	7.51880	417.83	13892.9
134	17956	2406104	11.5758	5.1172	7.46269	420.97	14102.6
135	18225	2460375	11.6190	5.1299	7.40741	424.12	14313.9
136	18496	2515456	11.6619	5.1426	7.35294	427.26	14526.7
137	18769	2571353	11.7047	5.1551	7.29927	430.40	14741.1
138	19044	2628072	11.7473	5.1676	7.24638	433.54	14957.1
139	19321	2685619	11.7898	5.1801	7.19424	436.68	15174.7
140	19600	2744000	11.8322	5.1925	7.14286	439.82	15393.8
141	19881	2803221	11.8743	5.2048	7.09220	442.96	15614.5
142	20164	2863288	11.9164	5.2171	7.04225	446.11	15836.8
143	20449	2924207	11.9583	5.2293	6.99301	449.25	16060.6
144	20736	2985984	12.0000	5.2415	6.94444	452.39	16286.0
145	21025	3048625	12.0416	5.2536	6.89655	455.53	16513.0
146	21316	3112136	12.0830	5.2656	6.84932	458.67	16741.5
147	21609	3176523	12.1244	5.2776	6.80272	461.81	16971.7
148	21904	3241792	12.1655	5.2896	6.75676	464.96	17203.4
149	22201	3307949	12.2066	5.3015	6.71141	468.10	17436.6

FUNCTIONS OF NUMBERS, 150 to 199

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
150	22500	3375000	12.2474	5.3133	6.66667	471.24	17671.5
151	22801	3442951	12.2882	5.3251	6.62252	474.38	17907.9
152	23104	3511808	12.3288	5.3368	6.57895	477.52	18145.8
153	23409	3581577	12.3693	5.3485	6.53595	480.66	18385.4
154	23716	3652264	12.4097	5.3601	6.49351	483.81	18626.5
155	24025	3723875	12.4499	5.3717	6.45161	486.95	18869.2
156	24336	3796416	12.4900	5.3832	6.41026	490.09	19113.4
157	24649	3869893	12.5300	5.3947	6.36943	493.23	19359.3
158	24964	3944312	12.5698	5.4061	6.32911	496.37	19606.7
159	25281	4019679	12.6095	5.4175	6.28931	499.51	19855.7
160	25600	4096000	12.6491	5.4288	6.25000	502.65	20106.2
161	25921	4173281	12.6886	5.4401	6.21118	505.80	20358.3
162	26244	4251528	12.7279	5.4514	6.17284	508.94	20612.0
163	26569	4330747	12.7671	5.4626	6.13497	512.08	20867.2
164	26896	4410944	12.8062	5.4737	6.09756	515.22	21124.1
165	27225	4492125	12.8452	5.4848	6.06061	518.36	21382.5
166	27556	4574296	12.8841	5.4959	6.02410	521.50	21642.4
167	27889	4657463	12.9228	5.5069	5.98802	524.65	21904.0
168	28224	4741632	12.9615	5.5178	5.95238	527.79	22167.1
169	28561	4826809	13.0000	5.5288	5.91716	530.93	22431.8
170	28900	4913000	13.0384	5.5397	5.88235	534.07	22698.0
171	29241	5000211	13.0767	5.5505	5.84795	537.21	22965.8
172	29584	5088448	13.1149	5.5613	5.81395	540.35	23235.2
173	29929	5177717	13.1529	5.5721	5.78035	543.50	23506.2
174	30276	5268024	13.1909	5.5828	5.74713	546.64	23778.7
175	30625	5359375	13.2288	5.5934	5.71429	549.78	24052.8
176	30976	5451776	13.2665	5.6041	5.68182	552.92	24328.5
177	31329	5545233	13.3041	5.6147	5.64972	556.06	24605.7
178	31684	5639752	13.3417	5.6252	5.61798	559.20	24884.6
179	32041	5735339	13.3791	5.6357	5.58659	562.35	25164.9
180	32400	5832000	13.4164	5.6462	5.55556	565.49	25446.9
181	32761	5929741	13.4536	5.6567	5.52486	568.63	25730.4
182	33124	6028568	13.4907	5.6671	5.49451	571.77	26015.5
183	33489	6128487	13.5277	5.6774	5.46448	574.91	26302.2
184	33856	6229504	13.5647	5.6877	5.43478	578.05	26590.4
185	34225	6331625	13.6015	5.6980	5.40541	581.19	26880.3
186	34596	6434856	13.6382	5.7083	5.37634	584.34	27171.6
187	34969	6539203	13.6748	5.7185	5.34759	587.48	27464.6
188	35344	6644672	13.7113	5.7287	5.31915	590.62	27759.1
189	35721	6751269	13.7477	5.7388	5.29101	593.76	28055.2
190	36100	6859000	13.7840	5.7489	5.26316	596.90	28352.9
191	36481	6967871	13.8203	5.7590	5.23560	600.04	28652.1
192	36864	7077888	13.8564	5.7690	5.20833	603.19	28952.9
193	37249	7189057	13.8924	5.7790	5.18135	606.33	29255.3
194	37636	7301384	13.9284	5.7890	5.15464	609.47	29559.2
195	38025	7414875	13.9642	5.7989	5.12821	612.61	29864.8
196	38416	7529536	14.0000	5.8088	5.10204	615.75	30171.9
197	38809	7645373	14.0357	5.8186	5.07614	618.89	30480.5
198	39204	7762392	14.0712	5.8285	5.05051	622.04	30790.7
199	39601	7880599	14.1067	5.8383	5.02513	625.18	31102.6

FUNCTIONS OF NUMBERS, 200 to 249

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter Circum.	No. = Diameter Area
200	40000	8000000	14.1421	5.8480	5.00000	628.32	31415.9
201	40401	8120601	14.1774	5.8578	4.97512	631.46	31730.9
202	40804	8242408	14.2127	5.8675	4.95050	634.60	32047.4
203	41209	8365427	14.2478	5.8771	4.92611	637.74	32365.5
204	41616	8489664	14.2829	5.8868	4.90196	640.88	32685.1
205	42025	8615125	14.3178	5.8964	4.87805	644.03	33006.4
206	42436	8741816	14.3527	5.9059	4.85437	647.17	33329.2
207	42849	8869743	14.3875	5.9155	4.83092	650.31	33653.5
208	43264	8998912	14.4222	5.9250	4.80769	653.45	33979.5
209	43681	9129329	14.4568	5.9345	4.78469	656.59	34307.0
210	44100	9261000	14.4914	5.9439	4.76190	659.73	34636.1
211	44521	9393931	14.5258	5.9533	4.73934	662.88	34966.7
212	44944	9528128	14.5602	5.9627	4.71698	666.02	35298.9
213	45369	9663597	14.5945	5.9721	4.69484	669.16	35632.7
214	45796	9800344	14.6287	5.9814	4.67290	672.30	35968.1
215	46225	9938375	14.6629	5.9907	4.65116	675.44	36305.0
216	46656	10077696	14.6969	6.0000	4.62963	678.58	36643.5
217	47089	10218313	14.7309	6.0092	4.60829	681.73	36983.6
218	47524	10360232	14.7648	6.0185	4.58716	684.87	37325.3
219	47961	10503459	14.7986	6.0277	4.56621	688.01	37668.5
220	48400	10648000	14.8324	6.0368	5.44545	691.15	38013.3
221	48841	10793861	14.8661	6.0459	4.52489	694.29	38359.6
222	49284	10941048	14.8997	6.0550	4.50450	697.43	38707.6
223	49729	11089567	14.9332	6.0641	4.48430	700.58	39057.1
224	50176	11239424	14.9666	6.0732	4.46429	703.72	39408.1
225	50625	11390625	15.0000	6.0822	4.44444	706.86	39760.8
226	51076	11543176	15.0333	6.0912	4.42478	710.00	40115.0
227	51529	11697083	15.0665	6.1002	4.40529	713.14	40470.8
228	51984	11852352	15.0997	6.1091	4.38596	716.28	40828.1
229	52441	12008989	15.1327	6.1180	4.36681	719.42	41187.1
230	52900	12167000	15.1658	6.1269	4.34783	722.57	41547.6
231	53361	12326391	15.1987	6.1358	4.32900	725.71	41909.6
232	53824	12487168	15.2315	6.1446	4.31034	728.85	42273.3
233	54289	12649337	15.2643	6.1534	4.29185	731.99	42638.5
234	54756	12812904	15.2971	6.1622	4.27350	735.13	43005.3
235	55225	12977875	15.3297	6.1710	4.25532	738.27	43373.6
236	55696	13144256	15.3623	6.1797	4.23729	741.42	43743.5
237	56169	13312053	15.3948	6.1885	4.21941	744.56	44115.0
238	56644	13481272	15.4272	6.1972	4.20168	747.70	44488.1
239	57121	13651919	15.4596	6.2058	4.18410	750.84	44862.7
240	57600	13824000	15.4919	6.2145	4.16667	753.98	45238.9
241	58081	13997521	15.5242	6.2231	4.14938	757.12	45616.7
242	58564	14172488	15.5563	6.2317	4.13223	760.27	45996.1
243	59049	14348907	15.5885	6.2403	4.11523	763.41	46377.0
244	59536	14526784	15.6205	6.2488	4.09836	766.55	46759.5
245	60025	14706125	15.6525	6.2573	4.08163	769.69	47143.5
246	60516	14886936	15.6844	6.2658	4.06504	772.83	47529.2
247	61009	15069223	15.7162	6.2743	4.04858	775.97	47916.4
248	61504	15252992	15.7480	6.2828	4.03226	779.12	48305.1
249	62001	15438249	15.7797	6.2912	4.01606	782.26	48695.5

FUNCTIONS OF NUMBERS, 250 to 299

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
250	62500	15625000	15.8114	6.2996	4.00000	785.40	49087.4
251	63001	15813251	15.8430	6.3080	3.98406	788.54	49480.9
252	63504	16003008	15.8745	6.3164	3.96825	791.68	49875.9
253	64009	16194277	15.9060	6.3247	3.95257	794.82	50272.6
254	64516	16387064	15.9374	6.3330	3.93701	797.96	50670.7
255	65025	16581375	15.9687	6.3413	3.92157	801.11	51070.5
256	65536	16777216	16.0000	6.3496	3.90625	804.25	51471.9
257	66049	16974593	16.0312	6.3579	3.89105	807.39	51874.8
258	66564	17173512	16.0624	6.3661	3.87597	810.53	52279.2
259	67081	17373979	16.0935	6.3743	3.86100	813.67	52685.3
260	67600	17576000	16.1245	6.3825	3.84615	816.81	53092.9
261	68121	17779581	16.1555	6.3907	3.83142	819.96	53502.1
262	68644	17984728	16.1864	6.3988	3.81679	823.10	53912.9
263	69169	18191447	16.2173	6.4070	3.80228	826.24	54325.2
264	69696	18399744	16.2481	6.4151	3.78788	829.38	54739.1
265	70225	18609625	16.2788	6.4232	3.77358	832.52	55154.6
266	70756	18821096	16.3095	6.4312	3.75940	835.66	55571.6
267	71289	19034163	16.3401	6.4393	3.74532	838.81	55990.2
268	71824	19248832	16.3707	6.4473	3.73134	841.95	56410.4
269	72361	19465109	16.4012	6.4553	3.71747	845.09	56832.2
270	72900	19683000	16.4317	6.4633	3.70370	848.23	57255.5
271	73441	19902511	16.4621	6.4713	3.69004	851.37	57680.4
272	73984	20123648	16.4924	6.4792	3.67647	854.51	58106.9
273	74529	20346417	16.5227	6.4872	3.66300	857.65	58534.9
274	75076	20570824	16.5529	6.4951	3.64964	860.80	58964.6
275	75625	20796875	16.5831	6.5030	3.63636	863.94	59395.7
276	76176	21024576	16.6132	6.5108	3.62319	867.08	59828.5
277	76729	21253933	16.6433	6.5187	3.61011	870.22	60262.8
278	77284	21484952	16.6733	6.5265	3.59712	873.36	60698.7
279	77841	21717639	16.7033	6.5343	3.58423	876.50	61136.2
280	78400	21952000	16.7332	6.5421	3.57143	879.65	61575.2
281	78961	22188041	16.7631	6.5499	3.55872	882.79	62015.8
282	79524	22425768	16.7929	6.5577	3.54610	885.93	62458.0
283	80089	22665187	16.8226	6.5654	3.53357	889.07	62901.8
284	80656	22906304	16.8523	6.5731	3.52113	892.21	63347.1
285	81225	23149125	16.8819	6.5808	3.50877	895.35	63794.0
286	81796	23393656	16.9115	6.5885	3.49650	898.50	64242.4
287	82369	23639903	16.9411	6.5962	3.48432	901.64	64692.5
288	82944	23887872	16.9706	6.6039	3.47222	904.78	65144.1
289	83521	24137569	17.0000	6.6115	3.46021	907.92	65597.2
290	84100	24389000	17.0294	6.6191	3.44828	911.06	66052.0
291	84681	24642171	17.0587	6.6267	3.43643	914.20	66508.3
292	85264	24897088	17.0880	6.6343	3.42466	917.35	66966.2
293	85849	25153757	17.1172	6.6419	3.41297	920.49	67425.6
294	86436	25412184	17.1464	6.6494	3.40136	923.63	67886.7
295	87025	25672375	17.1756	6.6569	3.38983	926.77	68349.3
296	87616	25934336	17.2047	6.6644	3.37838	929.91	68813.4
297	88209	26198073	17.2337	6.6719	3.36700	933.05	69279.2
298	88804	26463592	17.2627	6.6794	3.35570	936.19	69746.5
299	89401	26730899	17.2916	6.6869	3.34448	939.34	70215.4

FUNCTIONS OF NUMBERS, 300 to 349

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
300	90000	27000000	17.3205	6.6943	3.33333	942.48	70685.8
301	90601	27270901	17.3494	6.7018	3.32226	945.62	71157.9
302	91204	27543608	17.3781	6.7092	3.31126	948.76	71631.5
303	91809	27818127	17.4069	6.7166	3.30033	951.90	72106.6
304	92416	28094464	17.4356	6.7240	3.28947	955.04	72583.4
305	93025	28372625	17.4642	6.7313	3.27869	958.19	73061.7
306	93636	28652616	17.4929	6.7387	3.26797	961.33	73541.5
307	94249	28934443	17.5214	6.7460	3.25733	964.47	74023.0
308	94864	29218112	17.5499	6.7533	3.24675	967.61	74506.0
309	95481	29503629	17.5784	6.7606	3.23625	970.75	74990.6
310	96100	29791000	17.6068	6.7679	3.22581	973.89	75476.8
311	96721	30080231	17.6352	6.7752	3.21543	977.04	75964.5
312	97344	30371328	17.6635	6.7824	3.20513	980.18	76453.8
313	97969	30664297	17.6918	6.7897	3.19489	983.32	76944.7
314	98596	30959144	17.7200	6.7969	3.18471	986.46	77437.1
315	99225	31255875	17.7482	6.8041	3.17460	989.60	77931.1
316	99856	31554496	17.7764	6.8113	3.16456	992.74	78426.7
317	100489	31855013	17.8045	6.8185	3.15457	995.88	78923.9
318	101124	32157432	17.8326	6.8256	3.14465	999.03	79422.6
319	101761	32461759	17.8606	6.8328	3.13480	1002.2	79922.9
320	102400	32768000	17.8885	6.8399	3.12500	1005.3	80424.8
321	103041	33076161	17.9165	6.8470	3.11526	1008.5	80928.2
322	103684	33386248	17.9444	6.8541	3.10559	1011.6	81433.2
323	104329	33698267	17.9722	6.8612	3.09598	1014.7	81939.8
324	104976	34012224	18.0000	6.8683	3.08642	1017.9	82448.0
325	105625	34328125	18.0278	6.8753	3.07692	1021.0	82957.7
326	106276	34645976	18.0555	6.8824	3.06749	1024.2	83469.0
327	106929	34965783	18.0831	6.8894	3.05810	1027.3	83981.8
328	107584	35287552	18.1108	6.8964	3.04878	1030.4	84496.3
329	108241	35611289	18.1384	6.9034	3.03951	1033.6	85012.3
330	108900	35937000	18.1659	6.9104	3.03030	1036.7	85529.9
331	109561	36264691	18.1934	6.9174	3.02115	1039.9	86049.0
332	110224	36594368	18.2209	6.9244	3.01205	1043.0	86569.7
333	110889	36926037	18.2483	6.9313	3.00300	1046.2	87092.0
334	111556	37259704	18.2757	6.9382	2.99401	1049.3	87615.9
335	112225	37595375	18.3030	6.9451	2.98507	1052.4	88141.3
336	112896	37933056	18.3303	6.9521	2.97619	1055.6	88668.3
337	113569	38272753	18.3576	6.9589	2.96736	1058.7	89196.9
338	114244	38614472	18.3848	6.9658	2.95858	1061.9	89727.0
339	114921	38958219	18.4120	6.9727	2.94985	1065.0	90258.7
340	115600	39304000	18.4391	6.9795	2.94118	1068.1	90792.0
341	116281	39651821	18.4662	6.9864	2.93255	1071.3	91326.9
342	116964	40001688	18.4932	6.9932	2.92398	1074.4	91863.3
343	117649	40353607	18.5203	7.0000	2.91545	1077.6	92401.3
344	118336	40707584	18.5472	7.0068	2.90698	1080.7	92940.9
345	119025	41063625	18.5742	7.0136	2.89855	1083.8	93482.0
346	119716	41421736	18.6011	7.0203	2.89017	1087.0	94024.7
347	120409	41781923	18.6279	7.0271	2.88184	1090.1	94569.0
348	121104	42144192	18.6548	7.0338	2.87356	1093.3	95114.9
349	121801	42508549	18.6815	7.0406	2.86533	1096.4	95662.3

FUNCTIONS OF NUMBERS, 350 to 399

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
350	122500	42875000	18.7083	7.0473	2.85714	1099.6	96211.3
351	123201	43243551	18.7350	7.0540	2.84900	1102.7	96761.8
352	123904	43614208	18.7617	7.0607	2.84091	1105.8	97314.0
353	124609	43986977	18.7883	7.0674	2.83286	1109.0	97867.7
354	125316	44361864	18.8149	7.0740	2.82486	1112.1	98423.0
355	126025	44738875	18.8414	7.0807	2.81690	1115.3	98979.8
356	126736	45118016	18.8680	7.0873	2.80899	1118.4	99538.2
357	127449	45499293	18.8944	7.0940	2.80112	1121.5	100098
358	128164	45882712	18.9209	7.1006	2.79330	1124.7	100660
359	128881	46268279	18.9473	7.1072	2.78552	1127.8	101223
360	129600	46656000	18.9737	7.1138	2.77778	1131.0	101788
361	130321	47045881	19.0000	7.1204	2.77008	1134.1	102354
362	131044	47437928	19.0263	7.1269	2.76243	1137.3	102922
363	131769	47832147	19.0526	7.1335	2.75482	1140.4	103491
364	132496	48228544	19.0788	7.1400	2.74725	1143.5	104062
365	133225	48627125	19.1050	7.1466	2.73973	1146.7	104635
366	133956	49027896	19.1311	7.1531	2.73224	1149.8	105209
367	134689	49430863	19.1572	7.1596	2.72480	1153.0	105785
368	135424	49836032	19.1833	7.1661	2.71739	1156.1	106362
369	136161	50243409	19.2094	7.1726	2.71003	1159.2	106941
370	136900	50653000	19.2354	7.1791	2.70270	1162.4	107521
371	137641	51064811	19.2614	7.1855	2.69542	1165.5	108103
372	138384	51478848	19.2873	7.1920	2.68817	1168.7	108687
373	139129	51895117	19.3132	7.1984	2.68097	1171.8	109272
374	139876	52313624	19.3391	7.2048	2.67380	1175.0	109858
375	140625	52734375	19.3649	7.2112	2.66667	1178.1	110447
376	141376	53157376	19.3907	7.2177	2.65957	1181.2	111036
377	142129	53582633	19.4165	7.2240	2.65252	1184.4	111628
378	142884	54010152	19.4422	7.2304	2.64550	1187.5	112221
379	143641	54439939	19.4679	7.2368	2.63852	1190.7	112815
380	144400	54872000	19.4936	7.2432	2.63158	1193.8	113411
381	145161	55306341	19.5192	7.2495	2.62467	1196.9	114009
382	145924	55742968	19.5448	7.2558	2.61780	1200.1	114608
383	146689	56181887	19.5704	7.2622	2.61097	1203.2	115209
384	147456	56623104	19.5959	7.2685	2.60417	1206.4	115812
385	148225	57066625	19.6214	7.2748	2.59740	1209.5	116416
386	148996	57512456	19.6469	7.2811	2.59067	1212.7	117021
387	149769	57960603	19.6723	7.2874	2.58398	1215.8	117628
388	150544	58411072	19.6977	7.2936	2.57732	1218.9	118237
389	151321	58863869	19.7231	7.2999	2.57069	1222.1	118847
390	152100	59319000	19.7484	7.3061	2.56410	1225.2	119459
391	152881	59776471	19.7737	7.3124	2.55754	1228.4	120072
392	153664	60236288	19.7990	7.3186	2.55102	1231.5	120687
393	154449	60698457	19.8242	7.3248	2.54453	1234.6	121304
394	155236	61162984	19.8494	7.3310	2.53807	1237.8	121922
395	156025	61629875	19.8746	7.3372	2.53165	1240.9	122542
396	156816	62099136	19.8997	7.3434	2.52525	1244.1	123163
397	157609	62570773	19.9249	7.3496	2.51889	1247.2	123786
398	158404	63044792	19.9499	7.3558	2.51256	1250.4	124410
399	159201	63521199	19.9750	7.3619	2.50627	1253.5	125036

FUNCTIONS OF NUMBERS, 400 to 449

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter Circum.	No. = Diameter Area
400	160000	64000000	20.0000	7.3681	2.50000	1256.6	125664
401	160801	64481201	20.0250	7.3742	2.49377	1259.8	126293
402	161604	64964808	20.0499	7.3803	2.48756	1262.9	126923
403	162409	65450827	20.0749	7.3864	2.48139	1266.1	127556
404	163216	65939264	20.0998	7.3925	2.47525	1269.2	128190
405	164025	66430125	20.1246	7.3986	2.46914	1272.3	128825
406	164836	66923416	20.1494	7.4047	2.46305	1275.5	129462
407	165649	67419143	20.1742	7.4108	2.45700	1278.6	130100
408	166464	67917312	20.1990	7.4169	2.45098	1281.8	130741
409	167281	68417929	20.2237	7.4229	2.44499	1284.9	131382
410	168100	68921000	20.2485	7.4290	2.43902	1288.1	132025
411	168921	69426531	20.2731	7.4350	2.43309	1291.2	132670
412	169744	69934528	20.2978	7.4410	2.42718	1294.3	133317
413	170569	70444997	20.3224	7.4470	2.42131	1297.5	133965
414	171396	70957944	20.3470	7.4530	2.41546	1300.6	134614
415	172225	71473375	20.3715	7.4590	2.40964	1303.8	135265
416	173056	71991296	20.3961	7.4650	2.40385	1306.9	135918
417	173889	72511713	20.4206	7.4710	2.39808	1310.0	136572
418	174724	73034632	20.4450	7.4770	2.39234	1313.2	137228
419	175561	73560059	20.4695	7.4829	2.38663	1316.3	137885
420	176400	74088000	20.4939	7.4889	2.38095	1319.5	138544
421	177241	74618461	20.5183	7.4948	2.37530	1322.6	139205
422	178084	75151448	20.5426	7.5007	2.36967	1325.8	139867
423	178929	75686967	20.5670	7.5067	2.36407	1328.9	140531
424	179776	76225024	20.5913	7.5126	2.35849	1332.0	141196
425	180625	76765625	20.6155	7.5185	2.35294	1335.2	141863
426	181476	77308776	20.6398	7.5244	2.34742	1338.3	142531
427	182329	77854483	20.6640	7.5302	2.34192	1341.5	143201
428	183184	78402752	20.6882	7.5361	2.33645	1344.6	143872
429	184041	78953589	20.7123	7.5420	2.33100	1347.7	144545
430	184900	79507000	20.7364	7.5478	2.32558	1350.9	145220
431	185761	80062991	20.7605	7.5537	2.32019	1354.0	145896
432	186624	80621568	20.7846	7.5595	2.31481	1357.2	146574
433	187489	81182737	20.8087	7.5654	2.30947	1360.3	147254
434	188356	81746504	20.8327	7.5712	2.30415	1363.5	147934
435	189225	82312875	20.8567	7.5770	2.29885	1366.6	148617
436	190096	82881856	20.8806	7.5828	2.29358	1369.7	149301
437	190969	83453453	20.9045	7.5886	2.28833	1372.9	149987
438	191844	84027672	20.9284	7.5944	2.28311	1376.0	150674
439	192721	84604519	20.9523	7.6001	2.27790	1379.2	151363
440	193600	85184000	20.9762	7.6059	2.27273	1382.3	152053
441	194481	85766121	21.0000	7.6117	2.26757	1385.4	152745
442	195364	86350888	21.0238	7.6174	2.26244	1388.6	153439
443	196249	86938307	21.0476	7.6232	2.25734	1391.7	154134
444	197136	87528384	21.0713	7.6289	2.25225	1394.9	154830
445	198025	88121125	21.0950	7.6346	2.24719	1398.0	155528
446	198916	88716536	21.1187	7.6403	2.24215	1401.2	156228
447	199809	89314623	21.1424	7.6460	2.23714	1404.3	156930
448	200704	89915392	21.1660	7.6517	2.23214	1407.4	157633
449	201601	90518849	21.1896	7.6574	2.22717	1410.6	158337

FUNCTIONS OF NUMBERS, 450 to 499

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
450	202500	91125000	21.2132	7.6631	2.22222	1413.7	159043
451	203401	91733851	21.2368	7.6688	2.21729	1416.9	159751
452	204304	92345408	21.2603	7.6744	2.21239	1420.0	160460
453	205209	92959677	21.2838	7.6801	2.20751	1423.1	161171
454	206116	93576664	21.3073	7.6857	2.20264	1426.3	161883
455	207025	94196375	21.3307	7.6914	2.19780	1429.4	162597
456	207936	94818816	21.3542	7.6970	2.19298	1432.6	163313
457	208849	95443993	21.3776	7.7026	2.18818	1435.7	164030
458	209764	96071912	21.4009	7.7082	2.18341	1438.8	164748
459	210681	96702579	21.4243	7.7138	2.17865	1442.0	165468
460	211600	97336000	21.4476	7.7194	2.17391	1445.1	166190
461	212521	97972181	21.4709	7.7250	2.16920	1448.3	166914
462	213444	98611128	21.4942	7.7306	2.16450	1451.4	167639
463	214369	99252847	21.5174	7.7362	2.15983	1454.6	168365
464	215296	99897344	21.5407	7.7418	2.15517	1457.7	169093
465	216225	100544625	21.5639	7.7473	2.15054	1460.8	169823
466	217156	101194696	21.5870	7.7529	2.14592	1464.0	170554
467	218089	101847563	21.6102	7.7584	2.14133	1467.1	171287
468	219024	102503232	21.6333	7.7639	2.13675	1470.3	172021
469	219961	103161709	21.6564	7.7695	2.13220	1473.4	172757
470	220900	103823000	21.6795	7.7750	2.12766	1476.5	173494
471	221841	104487111	21.7025	7.7805	2.12314	1479.7	174234
472	222784	105154048	21.7256	7.7860	2.11864	1482.8	174974
473	223729	105823817	21.7486	7.7915	2.11416	1486.0	175716
474	224676	106496424	21.7715	7.7970	2.10970	1489.1	176460
475	225625	107171875	21.7945	7.8025	2.10526	1492.3	177205
476	226576	107850176	21.8174	7.8079	2.10084	1495.4	177952
477	227529	108531333	21.8403	7.8134	2.09644	1498.5	178701
478	228484	109215352	21.8632	7.8188	2.09205	1501.7	179451
479	229441	109902239	21.8861	7.8243	2.08768	1504.8	180203
480	230400	110592000	21.9089	7.8297	2.08333	1508.0	180956
481	231361	111284641	21.9317	7.8352	2.07900	1511.1	181711
482	232324	111980168	21.9545	7.8406	2.07469	1514.2	182467
483	233289	112678587	21.9773	7.8460	2.07039	1517.4	183225
484	234256	113379904	22.0000	7.8514	2.06612	1520.5	183984
485	235225	114084125	22.0227	7.8568	2.06186	1523.7	184745
486	236196	114791256	22.0454	7.8622	2.05761	1526.8	185508
487	237169	115501303	22.0681	7.8676	2.05339	1530.0	186272
488	238144	116214272	22.0907	7.8730	2.04918	1533.1	187038
489	239121	116930169	22.1133	7.8784	2.04499	1536.2	187805
490	240100	117649000	22.1359	7.8837	2.04082	1539.4	188574
491	241081	118370771	22.1585	7.8891	2.03666	1542.5	189345
492	242064	119095488	22.1811	7.8944	2.03252	1545.7	190117
493	243049	119823157	22.2036	7.8998	2.02840	1548.8	190890
494	244036	120553784	22.2261	7.9051	2.02429	1551.9	191665
495	245025	121287375	22.2486	7.9105	2.02020	1555.1	192442
496	246016	122023936	22.2711	7.9158	2.01613	1558.2	193221
497	247009	122763473	22.2935	7.9211	2.01207	1561.4	194000
498	248004	123505992	22.3159	7.9264	2.00803	1564.5	194782
499	249001	124251499	22.3383	7.9317	2.00401	1567.7	195565

FUNCTIONS OF NUMBERS, 500 to 549

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter Circum.	No. = Diameter Area
500	250000	125000000	22.3607	7.9370	2.00000	1570.8	196350
501	251001	125751501	22.3830	7.9423	1.99601	1573.9	197136
502	252004	126506008	22.4054	7.9476	1.99203	1577.1	197923
503	253009	127263527	22.4277	7.9528	1.98807	1580.2	198713
504	254016	128024064	22.4499	7.9581	1.98413	1583.4	199504
505	255025	128787625	22.4722	7.9634	1.98020	1586.5	200296
506	256036	129554216	22.4944	7.9686	1.97628	1589.6	201090
507	257049	130323843	22.5167	7.9739	1.97239	1592.8	201886
508	258064	131096512	22.5389	7.9791	1.96850	1595.9	202683
509	259081	131872229	22.5610	7.9843	1.96464	1599.1	203482
510	260100	132651000	22.5832	7.9896	1.96078	1602.2	204282
511	261121	133432831	22.6053	7.9948	1.95695	1605.4	205084
512	262144	134217728	22.6274	8.0000	1.95312	1608.5	205887
513	263169	135005697	22.6495	8.0052	1.94932	1611.6	206692
514	264196	135796744	22.6716	8.0104	1.94553	1614.8	207499
515	265225	136590875	22.6936	8.0156	1.94175	1617.9	208307
516	266256	137388096	22.7156	8.0208	1.93798	1621.1	209117
517	267289	138188413	22.7376	8.0260	1.93424	1624.2	209928
518	268324	138991832	22.7596	8.0311	1.93050	1627.3	210741
519	269361	139798359	22.7816	8.0363	1.92678	1630.5	211556
520	270400	140608000	22.8035	8.0415	1.92308	1633.6	212372
521	271441	141420761	22.8254	8.0466	1.91939	1636.8	213189
522	272484	142236648	22.8473	8.0517	1.91571	1639.9	214008
523	273529	143055667	22.8692	8.0569	1.91205	1643.1	214829
524	274576	143877824	22.8910	8.0620	1.90840	1646.2	215651
525	275625	144703125	22.9129	8.0671	1.90476	1649.3	216475
526	276676	145531576	22.9347	8.0723	1.90114	1652.5	217301
527	277729	146363183	22.9565	8.0774	1.89753	1655.6	218128
528	278784	147197952	22.9783	8.0825	1.89394	1658.8	218956
529	279841	148035889	23.0000	8.0876	1.89036	1661.9	219787
530	280900	148877000	23.0217	8.0927	1.88679	1665.0	220618
531	281961	149721291	23.0434	8.0978	1.88324	1668.2	221452
532	283024	150568768	23.0651	8.1028	1.87970	1671.3	222287
533	284089	151419437	23.0868	8.1079	1.87617	1674.5	223123
534	285156	152273304	23.1084	8.1130	1.87266	1677.6	223961
535	286225	153130375	23.1301	8.1180	1.86916	1680.8	224801
536	287296	153990656	23.1517	8.1231	1.86567	1683.9	225642
537	288369	154854153	23.1733	8.1281	1.86220	1687.0	226484
538	289444	155720872	23.1948	8.1332	1.85874	1690.2	227329
539	290521	156590819	23.2164	8.1382	1.85529	1693.3	228175
540	291600	157464000	23.2379	8.1433	1.85185	1696.5	229022
541	292681	158340421	23.2594	8.1483	1.84843	1699.6	229871
542	293764	159220088	23.2809	8.1533	1.84502	1702.7	230722
543	294849	160103007	23.3024	8.1583	1.84162	1705.9	231574
544	295936	160989184	23.3238	8.1633	1.83824	1709.0	232428
545	297025	161878625	23.3452	8.1683	1.83486	1712.2	233283
546	298116	162771336	23.3666	8.1733	1.83150	1715.3	234140
547	299209	163667323	23.3880	8.1783	1.82815	1718.5	234998
548	300304	164566592	23.4094	8.1833	1.82482	1721.6	235858
549	301401	165469149	23.4307	8.1882	1.82149	1724.7	236720

FUNCTIONS OF NUMBERS, 550 to 599

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
550	302500	166375000	23.4521	8.1932	1.81818	1727.9	237583
551	303601	167284151	23.4734	8.1982	1.81488	1731.0	238448
552	304704	168196608	23.4947	8.2031	1.81159	1734.2	239314
553	305809	169112377	23.5160	8.2081	1.80832	1737.3	240182
554	306916	170031464	23.5372	8.2130	1.80505	1740.4	241051
555	308025	170953875	23.5584	8.2180	1.80180	1743.6	241922
556	309136	171879616	23.5797	8.2229	1.79856	1746.7	242795
557	310249	172808693	23.6008	8.2278	1.79533	1749.9	243669
558	311364	173741112	23.6220	8.2327	1.79211	1753.0	244545
559	312481	174676879	23.6432	8.2377	1.78891	1756.2	245422
560	313600	175616000	23.6643	8.2426	1.78571	1759.3	246301
561	314721	176558481	23.6854	8.2475	1.78253	1762.4	247181
562	315844	177504328	23.7065	8.2524	1.77936	1765.6	248063
563	316969	178453547	23.7276	8.2573	1.77620	1768.7	248947
564	318096	179406144	23.7487	8.2621	1.77305	1771.9	249832
565	319225	180362125	23.7697	8.2670	1.76991	1775.0	250719
566	320356	181321496	23.7908	8.2719	1.76678	1778.1	251607
567	321489	182284263	23.8118	8.2768	1.76367	1781.3	252497
568	322624	183250432	23.8328	8.2816	1.76056	1784.4	253388
569	323761	184220009	23.8537	8.2865	1.75747	1787.6	254281
570	324900	185193000	23.8747	8.2913	1.75439	1790.7	255176
571	326041	186169411	23.8956	8.2962	1.75131	1793.8	256072
572	327184	187149248	23.9165	8.3010	1.74825	1797.0	256970
573	328329	188132517	23.9374	8.3059	1.74520	1800.1	257869
574	329476	189119224	23.9583	8.3107	1.74216	1803.3	258770
575	330625	190109375	23.9792	8.3155	1.73913	1806.4	259672
576	331776	191102976	24.0000	8.3203	1.73611	1809.6	260576
577	332929	192100033	24.0208	8.3251	1.73310	1812.7	261482
578	334084	193100552	24.0416	8.3300	1.73010	1815.8	262389
579	335241	194104539	24.0624	8.3348	1.72712	1819.0	263298
580	336400	195112000	24.0832	8.3396	1.72414	1822.1	264208
581	337561	196122941	24.1039	8.3443	1.72117	1825.3	265120
582	338724	197137368	24.1247	8.3491	1.71821	1828.4	266033
583	339889	198155287	24.1454	8.3539	1.71527	1831.6	266948
584	341056	199176704	24.1661	8.3587	1.71233	1834.7	267865
585	342225	200201625	24.1868	8.3634	1.70940	1837.8	268783
586	343396	201230056	24.2074	8.3682	1.70648	1841.0	269703
587	344569	202262003	24.2281	8.3730	1.70358	1844.1	270624
588	345744	203297472	24.2487	8.3777	1.70068	1847.3	271547
589	346921	204336469	24.2693	8.3825	1.69779	1850.4	272471
590	348100	205379000	24.2899	8.3872	1.69492	1853.5	273397
591	349281	206425071	24.3105	8.3919	1.69205	1856.7	274325
592	350464	207474688	24.3311	8.3967	1.68919	1859.8	275254
593	351649	208527857	24.3516	8.4014	1.68634	1863.0	276184
594	352836	209584584	24.3721	8.4061	1.68350	1866.1	277117
595	354025	210644875	24.3926	8.4108	1.68067	1869.2	278051
596	355216	211708736	24.4131	8.4155	1.67785	1872.4	278986
597	356409	212776173	24.4336	8.4202	1.67504	1875.5	279923
598	357604	213847192	24.4540	8.4249	1.67224	1878.7	280862
599	358801	214921799	24.4745	8.4296	1.66945	1881.8	281802

FUNCTIONS OF NUMBERS, 600 to 649

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
600	360000	216000000	24.4949	8.4343	1.66667	1885.0	282743
601	361201	217081801	24.5153	8.4390	1.66389	1888.1	283687
602	362404	218167208	24.5357	8.4437	1.66113	1891.2	284631
603	363609	219256227	24.5561	8.4484	1.65837	1894.4	285578
604	364816	220348864	24.5764	8.4530	1.65563	1897.5	286526
605	366025	221445125	24.5967	8.4577	1.65289	1900.7	287475
606	367236	222545016	24.6171	8.4623	1.65017	1903.8	288426
607	368449	223648543	24.6374	8.4670	1.64745	1906.9	289379
608	369664	224755712	24.6577	8.4716	1.64474	1910.1	290333
609	370881	225866529	24.6779	8.4763	1.64204	1913.2	291289
610	372100	226981000	24.6982	8.4809	1.63934	1916.4	292247
611	373321	228099131	24.7184	8.4856	1.63666	1919.5	293206
612	374544	229220928	24.7386	8.4902	1.63399	1922.7	294166
613	375769	230346397	24.7588	8.4948	1.63132	1925.8	295128
614	376996	231475544	24.7790	8.4994	1.62866	1928.9	296092
615	378225	232608375	24.7992	8.5040	1.62602	1932.1	297057
616	379456	233744896	24.8193	8.5086	1.62338	1935.2	298024
617	380689	234885113	24.8395	8.5132	1.62075	1938.4	298992
618	381924	236029032	24.8596	8.5178	1.61812	1941.5	299962
619	383161	237176659	24.8797	8.5224	1.61551	1944.6	300934
620	384400	238328000	24.8998	8.5270	1.61290	1947.8	301907
621	385641	239483061	24.9199	8.5316	1.61031	1950.9	302882
622	386884	240641848	24.9399	8.5362	1.60772	1954.1	303858
623	388129	241804367	24.9600	8.5408	1.60514	1957.2	304836
624	389376	242970624	24.9800	8.5453	1.60256	1960.4	305815
625	390625	244140625	25.0000	8.5499	1.60000	1963.5	306796
626	391876	245314376	25.0200	8.5544	1.59744	1966.6	307779
627	393129	246491883	25.0400	8.5590	1.59490	1969.8	308763
628	394384	247673152	25.0599	8.5635	1.59236	1972.9	309748
629	395641	248858189	25.0799	8.5681	1.58983	1976.1	310736
630	396900	250047000	25.0998	8.5726	1.58730	1979.2	311725
631	398161	251239591	25.1197	8.5772	1.58479	1982.3	312715
632	399424	252435968	25.1396	8.5817	1.58228	1985.5	313707
633	400689	253636137	25.1595	8.5862	1.57978	1988.6	314700
634	401956	254840104	25.1794	8.5907	1.57729	1991.8	315696
635	403225	256047875	25.1992	8.5952	1.57480	1994.9	316692
636	404496	257259456	25.2190	8.5997	1.57233	1998.1	317690
637	405769	258474853	25.2389	8.6043	1.56986	2001.2	318690
638	407044	259694072	25.2587	8.6088	1.56740	2004.3	319692
639	408321	260917119	25.2784	8.6132	1.56495	2007.5	320695
640	409600	262144000	25.2982	8.6177	1.56250	2010.6	321699
641	410881	263374721	25.3180	8.6222	1.56006	2013.8	322705
642	412164	264609288	25.3377	8.6267	1.55763	2016.9	323713
643	413449	265847707	25.3574	8.6312	1.55521	2020.0	324722
644	414736	267089984	25.3772	8.6357	1.55280	2023.2	325733
645	416025	268336125	25.3969	8.6401	1.55039	2026.3	326745
646	417316	269586136	25.4165	8.6446	1.54799	2029.5	327759
647	418609	270840023	25.4362	8.6490	1.54560	2032.6	328775
648	419904	272097792	25.4558	8.6535	1.54321	2035.8	329792
649	421201	273359449	25.4755	8.6579	1.54083	2038.9	330810

FUNCTIONS OF NUMBERS, 650 to 699

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
650	422500	274625000	25.4951	8.6624	1.53846	2042.0	331831
651	423801	275894451	25.5147	8.6668	1.53610	2045.2	332853
652	425104	277167808	25.5343	8.6713	1.53374	2048.3	333876
653	426409	278445077	25.5539	8.6757	1.53139	2051.5	334901
654	427716	279726264	25.5734	8.6801	1.52905	2054.6	335927
655	429025	281011375	25.5930	8.6845	1.52672	2057.7	336955
656	430336	282300416	25.6125	8.6890	1.52439	2060.9	337985
657	431649	283593393	25.6320	8.6934	1.52207	2064.0	339016
658	432964	284890312	25.6515	8.6978	1.51976	2067.2	340049
659	434281	286191179	25.6710	8.7022	1.51745	2070.3	341084
660	435600	287496000	25.6905	8.7066	1.51515	2073.5	342119
661	436921	288804781	25.7099	8.7110	1.51286	2076.6	343157
662	438244	290117528	25.7294	8.7154	1.51057	2079.7	344196
663	439569	291434247	25.7488	8.7198	1.50830	2082.9	345237
664	440896	292754944	25.7682	8.7241	1.50602	2086.0	346279
665	442225	294079625	25.7876	8.7285	1.50376	2089.2	347323
666	443556	295408296	25.8070	8.7329	1.50150	2092.3	348368
667	444889	296740963	25.8263	8.7373	1.49925	2095.4	349415
668	446224	298077632	25.8457	8.7416	1.49701	2098.6	350464
669	447561	299418309	25.8650	8.7460	1.49477	2101.7	351514
670	448900	300763000	25.8844	8.7503	1.49254	2104.9	352565
671	450241	302111711	25.9037	8.7547	1.49031	2108.0	353618
672	451584	303464448	25.9230	8.7590	1.48810	2111.2	354673
673	452929	304821217	25.9422	8.7634	1.48588	2114.3	355730
674	454276	306182024	25.9615	8.7677	1.48368	2117.4	356788
675	455625	307546875	25.9808	8.7721	1.48148	2120.6	357847
676	456976	308915776	26.0000	8.7764	1.47929	2123.7	358908
677	458329	310288733	26.0192	8.7807	1.47710	2126.9	359971
678	459684	311665752	26.0384	8.7850	1.47493	2130.0	361035
679	461041	313046839	26.0576	8.7893	1.47275	2133.1	362101
680	462400	314432000	26.0768	8.7937	1.47059	2136.3	363168
681	463761	315821241	26.0960	8.7980	1.46843	2139.4	364237
682	465124	317214568	26.1151	8.8023	1.46628	2142.6	365308
683	466489	318611987	26.1343	8.8066	1.46413	2145.7	366380
684	467856	320013504	26.1534	8.8109	1.46199	2148.8	367453
685	469225	321419125	26.1725	8.8152	1.45985	2152.0	368528
686	470596	322828856	26.1916	8.8194	1.45773	2155.1	369605
687	471969	324242703	26.2107	8.8237	1.45560	2158.3	370684
688	473344	325660672	26.2298	8.8280	1.45349	2161.4	371764
689	474721	327082769	26.2488	8.8323	1.45138	2164.6	372845
690	476100	328509000	26.2679	8.8366	1.44928	2167.7	373928
691	477481	329939371	26.2869	8.8408	1.44718	2170.8	375013
692	478864	331373888	26.3059	8.8451	1.44509	2174.0	376099
693	480249	332812557	26.3249	8.8493	1.44300	2177.1	377187
694	481636	334255384	26.3439	8.8536	1.44092	2180.3	378276
695	483025	335702375	26.3629	8.8578	1.43885	2183.4	379367
696	484416	337153536	26.3818	8.8621	1.43678	2186.5	380459
697	485809	338608873	26.4008	8.8663	1.43472	2189.7	381553
698	487204	340068392	26.4197	8.8706	1.43266	2192.8	382649
699	488601	341532099	26.4386	8.8748	1.43062	2196.0	383746

FUNCTIONS OF NUMBERS, 700 to 749

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter Circum.	No. = Diameter Area
700	490000	343000000	26.4575	8.8790	1.42857	2199.1	384845
701	491401	344472101	26.4764	8.8833	1.42653	2202.3	385945
702	492804	345948408	26.4953	8.8875	1.42450	2205.4	387047
703	494209	347428927	26.5141	8.8917	1.42248	2208.5	388151
704	495616	348913664	26.5330	8.8959	1.42045	2211.7	389256
705	497025	350402625	26.5518	8.9001	1.41844	2214.8	390363
706	498436	351895816	26.5707	8.9043	1.41643	2218.0	391471
707	499849	353393243	26.5895	8.9085	1.41443	2221.1	392580
708	501264	354894912	26.6083	8.9127	1.41243	2224.2	393692
709	502681	356400829	26.6271	8.9169	1.41044	2227.4	394805
710	504100	357911000	26.6458	8.9211	1.40845	2230.5	395919
711	505521	359425431	26.6646	8.9253	1.40647	2233.7	397035
712	506944	360944128	26.6833	8.9295	1.40449	2236.8	398153
713	508369	362467097	26.7021	8.9337	1.40252	2240.0	399272
714	509796	363994344	26.7208	8.9378	1.40056	2243.1	400393
715	511225	365525875	26.7395	8.9420	1.39860	2246.2	401515
716	512656	367061696	26.7582	8.9462	1.39665	2249.4	402639
717	514089	368601813	26.7769	8.9503	1.39470	2252.5	403765
718	515524	370146232	26.7955	8.9545	1.39276	2255.7	404892
719	516961	371694959	26.8142	8.9587	1.39082	2258.8	406020
720	518400	373248000	26.8328	8.9628	1.38889	2261.9	407150
721	519841	374805361	26.8514	8.9670	1.38696	2265.1	408282
722	521284	376367048	26.8701	8.9711	1.38504	2268.2	409415
723	522729	377933067	26.8887	8.9752	1.38313	2271.4	410550
724	524176	379503424	26.9072	8.9794	1.38122	2274.5	411687
725	525625	381078125	26.9258	8.9835	1.37931	2277.7	412825
726	527076	382657176	26.9444	8.9876	1.37741	2280.8	413965
727	528529	384240583	26.9629	8.9918	1.37552	2283.9	415106
728	529984	385828352	26.9815	8.9959	1.37363	2287.1	416248
729	531441	387420489	27.0000	9.0000	1.37174	2290.2	417393
730	532900	389017000	27.0185	9.0041	1.36986	2293.4	418539
731	534361	390617891	27.0370	9.0082	1.36799	2296.5	419686
732	535824	392223168	27.0555	9.0123	1.36612	2299.6	420835
733	537289	393832837	27.0740	9.0164	1.36426	2302.8	421986
734	538756	395446904	27.0924	9.0205	1.36240	2305.9	423138
735	540225	397065375	27.1109	9.0246	1.36054	2309.1	424293
736	541696	398688256	27.1293	9.0287	1.35870	2312.2	425447
737	543169	400315553	27.1477	9.0328	1.35685	2315.4	426604
738	544644	401947272	27.1662	9.0369	1.35501	2318.5	427762
739	546121	403583419	27.1846	9.0410	1.35318	2321.6	428922
740	547600	405224000	27.2029	9.0450	1.35135	2324.8	430084
741	549081	406869021	27.2213	9.0491	1.34953	2327.9	431247
742	550564	408518488	27.2397	9.0532	1.34771	2331.1	432412
743	552049	410172407	27.2580	9.0572	1.34590	2334.2	433578
744	553536	411830784	27.2764	9.0613	1.34409	2337.3	434746
745	555025	413493625	27.2947	9.0654	1.34228	2340.5	435916
746	556516	415160936	27.3130	9.0694	1.34048	2343.6	437087
747	558009	416832723	27.3313	9.0735	1.33869	2346.8	438259
748	559504	418508992	27.3496	9.0775	1.33690	2349.9	439433
749	561001	420189749	27.3679	9.0816	1.33511	2353.1	440609

FUNCTIONS OF NUMBERS, 750 to 799

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
750	562500	421875000	27.3861	9.0856	1.33333	2356.2	441786
751	564001	423564751	27.4044	9.0896	1.33156	2359.3	442965
752	565504	425259008	27.4226	9.0937	1.32979	2362.5	444146
753	567009	426957777	27.4408	9.0977	1.32802	2365.6	445328
754	568516	428661064	27.4591	9.1017	1.32626	2368.8	446511
755	570025	430368875	27.4773	9.1057	1.32450	2371.9	447697
756	571536	432081216	27.4955	9.1098	1.32275	2375.0	448883
757	573049	433798093	27.5136	9.1138	1.32100	2378.2	450072
758	574564	435519512	27.5318	9.1178	1.31926	2381.3	451262
759	576081	437245479	27.5500	9.1218	1.31752	2384.5	452453
760	577600	438976000	27.5681	9.1258	1.31579	2387.6	453646
761	579121	440711081	27.5862	9.1298	1.31406	2390.8	454841
762	580644	442450728	27.6043	9.1338	1.31234	2393.9	456037
763	582169	444194947	27.6225	9.1378	1.31062	2397.0	457234
764	583696	445943744	27.6405	9.1418	1.30890	2400.2	458434
765	585225	447697125	27.6586	9.1458	1.30719	2403.3	459635
766	586756	449455096	27.6767	9.1498	1.30548	2406.5	460837
767	588289	451217663	27.6948	9.1537	1.30378	2409.6	462041
768	589824	452984832	27.7128	9.1577	1.30208	2412.7	463247
769	591361	454756609	27.7308	9.1617	1.30039	2415.9	464454
770	592900	456533000	27.7489	9.1657	1.29870	2419.0	465663
771	594441	458314011	27.7669	9.1696	1.29702	2422.2	466873
772	595984	460099648	27.7849	9.1736	1.29534	2425.3	468085
773	597529	461889917	27.8029	9.1775	1.29366	2428.5	469298
774	599076	463684824	27.8209	9.1815	1.29199	2431.6	470513
775	600625	465484375	27.8388	9.1855	1.29032	2434.7	471730
776	602176	467288576	27.8568	9.1894	1.28866	2437.9	472948
777	603729	469097433	27.8747	9.1933	1.28700	2441.0	474168
778	605284	470910952	27.8927	9.1973	1.28535	2444.2	475389
779	606841	472729139	27.9106	9.2012	1.28370	2447.3	476612
780	608400	474552000	27.9285	9.2052	1.28205	2450.4	477836
781	609961	476379541	27.9464	9.2091	1.28041	2453.6	479062
782	611524	478211768	27.9643	9.2130	1.27877	2456.7	480290
783	613089	480048687	27.9821	9.2170	1.27714	2459.9	481519
784	614656	481890304	28.0000	9.2209	1.27551	2463.0	482750
785	616225	483736625	28.0179	9.2248	1.27389	2466.2	483982
786	617796	485587656	28.0357	9.2287	1.27226	2469.3	485216
787	619369	487443403	28.0535	9.2326	1.27065	2472.4	486451
788	620944	489303872	28.0713	9.2365	1.26904	2475.6	487688
789	622521	491169069	28.0891	9.2404	1.26743	2478.7	488927
790	624100	493039000	28.1069	9.2443	1.26582	2481.9	490167
791	625681	494913671	28.1247	9.2482	1.26422	2485.0	491409
792	627264	496793088	28.1425	9.2521	1.26263	2488.1	492652
793	628849	498677257	28.1603	9.2560	1.26103	2491.3	493897
794	630436	500566184	28.1780	9.2599	1.25945	2494.4	495143
795	632025	502459875	28.1957	9.2638	1.25786	2497.6	496391
796	633616	504358336	28.2135	9.2677	1.25628	2500.7	497641
797	635209	506261573	28.2312	9.2716	1.25471	2503.8	498892
798	636804	508169592	28.2489	9.2754	1.25313	2507.0	500145
799	638401	510082399	28.2666	9.2793	1.25156	2510.1	501399

FUNCTIONS OF NUMBERS, 800 to 849

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
800	640000	512000000	28.2843	9.2832	1.25000	2513.3	502655
801	641601	513922401	28.3019	9.2870	1.24844	2516.4	503912
802	643204	515849608	28.3196	9.2909	1.24688	2519.6	505171
803	644809	517781627	28.3373	9.2948	1.24533	2522.7	506432
804	646416	519718464	28.3549	9.2986	1.24378	2525.8	507694
805	648025	521660125	28.3725	9.3025	1.24224	2529.0	508958
806	649636	523606616	28.3901	9.3063	1.24069	2532.1	510223
807	651249	525557943	28.4077	9.3102	1.23916	2535.3	511490
808	652864	527514112	28.4253	9.3140	1.23762	2538.4	512758
809	654481	529475129	28.4429	9.3179	1.23609	2541.5	514028
810	656100	531441000	28.4605	9.3217	1.23457	2544.7	515300
811	657721	533411731	28.4781	9.3255	1.23305	2547.8	516573
812	659344	535387328	28.4956	9.3294	1.23153	2551.0	517848
813	660969	537367797	28.5132	9.3332	1.23001	2554.1	519124
814	662596	539353144	28.5307	9.3370	1.22850	2557.3	520402
815	664225	541343375	28.5482	9.3408	1.22699	2560.4	521681
816	665856	543338496	28.5657	9.3447	1.22549	2563.5	522962
817	667489	545338513	28.5832	9.3485	1.22399	2566.7	524245
818	669124	547343432	28.6007	9.3523	1.22249	2569.8	525529
819	670761	549353259	28.6182	9.3561	1.22100	2573.0	526814
820	672400	551368000	28.6356	9.3599	1.21951	2576.1	528102
821	674041	553387661	28.6531	9.3637	1.21803	2579.2	529391
822	675684	555412248	28.6705	9.3675	1.21655	2582.4	530681
823	677329	557441767	28.6880	9.3713	1.21507	2585.5	531973
824	678976	559476224	28.7054	9.3751	1.21359	2588.7	533267
825	680625	561515625	28.7228	9.3789	1.21212	2591.8	534562
826	682276	563559976	28.7402	9.3827	1.21065	2595.0	535858
827	683929	565609283	28.7576	9.3865	1.20919	2598.1	537157
828	685584	567663552	28.7750	9.3902	1.20773	2601.2	538456
829	687241	569722789	28.7924	9.3940	1.20627	2604.4	539758
830	688900	571787000	28.8097	9.3978	1.20482	2607.5	541061
831	690561	573856191	28.8271	9.4016	1.20337	2610.7	542365
832	692224	575930368	28.8444	9.4053	1.20192	2613.8	543671
833	693889	578009537	28.8617	9.4091	1.20048	2616.9	544979
834	695556	580093704	28.8791	9.4129	1.19904	2620.1	546288
835	697225	582182875	28.8964	9.4166	1.19760	2623.2	547599
836	698896	584277056	28.9137	9.4204	1.19617	2626.4	548912
837	700569	586376253	28.9310	9.4241	1.19474	2629.5	550226
838	702244	588480472	28.9482	9.4279	1.19332	2632.7	551541
839	703921	590589719	28.9655	9.4316	1.19190	2635.8	552858
840	705600	592704000	28.9828	9.4354	1.19048	2638.9	554177
841	707281	594823321	29.0000	9.4391	1.18906	2642.1	555497
842	708964	596947688	29.0172	9.4429	1.18765	2645.2	556819
843	710649	599077107	29.0345	9.4466	1.18624	2648.4	558142
844	712336	601211584	29.0517	9.4503	1.18483	2651.5	559467
845	714025	603351125	29.0689	9.4541	1.18343	2654.6	560794
846	715716	605495736	29.0861	9.4578	1.18203	2657.8	562122
847	717409	607645423	29.1033	9.4615	1.18064	2660.9	563452
848	719104	609800192	29.1204	9.4652	1.17925	2664.1	564783
849	720801	611960049	29.1376	9.4690	1.17786	2667.2	566116

FUNCTIONS OF NUMBERS, 850 to 899

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
850	722500	614125000	29.1548	9.4727	1.17647	2670.4	567450
851	724201	616295051	29.1719	9.4764	1.17509	2673.5	568786
852	725904	618470208	29.1890	9.4801	1.17371	2676.6	570124
853	727609	620650477	29.2062	9.4838	1.17233	2679.8	571463
854	729316	622835864	29.2233	9.4875	1.17096	2682.9	572803
855	731025	625026375	29.2404	9.4912	1.16959	2686.1	574146
856	732736	627222016	29.2575	9.4949	1.16822	2689.2	575490
857	734449	629422793	29.2746	9.4986	1.16686	2692.3	576835
858	736164	631628712	29.2916	9.5023	1.16550	2695.5	578182
859	737881	633839779	29.3087	9.5060	1.16414	2698.6	579530
860	739600	636056000	29.3258	9.5097	1.16279	2701.8	580880
861	741321	638277381	29.3428	9.5134	1.16144	2704.9	582232
862	743044	640503928	29.3598	9.5171	1.16009	2708.1	583585
863	744769	642735647	29.3769	9.5207	1.15875	2711.2	584940
864	746496	644972544	29.3939	9.5244	1.15741	2714.3	586297
865	748225	647214625	29.4109	9.5281	1.15607	2717.5	587655
866	749956	649461896	29.4279	9.5317	1.15473	2720.6	589014
867	751689	651714363	29.4449	9.5354	1.15340	2723.8	590375
868	753424	653972032	29.4618	9.5391	1.15207	2726.9	591738
869	755161	656234909	29.4788	9.5427	1.15075	2730.0	593102
870	756900	658503000	29.4958	9.5464	1.14943	2733.2	594468
871	758641	660776311	29.5127	9.5501	1.14811	2736.3	595835
872	760384	663054848	29.5296	9.5537	1.14679	2739.5	597204
873	762129	665338617	29.5466	9.5574	1.14548	2742.6	598575
874	763876	667627624	29.5635	9.5610	1.14416	2745.8	599947
875	765625	669921875	29.5804	9.5647	1.14286	2748.9	601320
876	767376	672221376	29.5973	9.5683	1.14155	2752.0	602696
877	769129	674526133	29.6142	9.5719	1.14025	2755.2	604073
878	770884	676836152	29.6311	9.5756	1.13895	2758.3	605451
879	772641	679151439	29.6479	9.5792	1.13766	2761.5	606831
880	774400	681472000	29.6648	9.5828	1.13636	2764.6	608212
881	776161	683797841	29.6816	9.5865	1.13507	2767.7	609595
882	777924	686128968	29.6985	9.5901	1.13379	2770.9	610980
883	779689	688465387	29.7153	9.5937	1.13250	2774.0	612366
884	781456	690807104	29.7321	9.5973	1.13122	2777.2	613754
885	783225	693154125	29.7489	9.6010	1.12994	2780.3	615143
886	784996	695506456	29.7658	9.6046	1.12867	2783.5	616534
887	786769	697864103	29.7825	9.6082	1.12740	2786.6	617927
888	788544	700227072	29.7993	9.6118	1.12613	2789.7	619321
889	790321	702595369	29.8161	9.6154	1.12486	2792.9	620717
890	792100	704969000	29.8329	9.6190	1.12360	2796.0	622114
891	793881	707347971	29.8496	9.6226	1.12233	2799.2	623513
892	795664	709732288	29.8664	9.6262	1.12108	2802.3	624913
893	797449	712121957	29.8831	9.6298	1.11982	2805.4	626315
894	799236	714516984	29.8998	9.6334	1.11857	2808.6	627718
895	801025	716917375	29.9166	9.6370	1.11732	2811.7	629124
896	802816	719323136	29.9333	9.6406	1.11607	2814.9	630530
897	804609	721734273	29.9500	9.6442	1.11483	2818.0	631938
898	806404	724150792	29.9666	9.6477	1.11359	2821.2	633348
899	808201	726572699	29.9833	9.6513	1.11235	2824.3	634760

FUNCTIONS OF NUMBERS, 900 to 949

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
900	810000	729000000	30.0000	9.6549	1.11111	2827.4	636173
901	811801	731432701	30.0167	9.6585	1.10988	2830.6	637587
902	813604	733870808	30.0333	9.6620	1.10865	2833.7	639003
903	815409	736314327	30.0500	9.6656	1.10742	2836.9	640421
904	817216	738763264	30.0666	9.6692	1.10619	2840.0	641840
905	819025	741217625	30.0832	9.6727	1.10497	2843.1	643261
906	820836	743677416	30.0998	9.6763	1.10375	2846.3	644683
907	822649	746142643	30.1164	9.6799	1.10254	2849.4	646107
908	824464	748613312	30.1330	9.6834	1.10132	2852.6	647533
909	826281	751089429	30.1496	9.6870	1.10011	2855.7	648960
910	828100	753571000	30.1662	9.6905	1.09890	2858.8	650388
911	829921	756058031	30.1828	9.6941	1.09769	2862.0	651818
912	831744	758550528	30.1993	9.6976	1.09649	2865.1	653250
913	833569	761048497	30.2159	9.7012	1.09529	2868.3	654684
914	835396	763551944	30.2324	9.7047	1.09409	2871.4	656118
915	837225	766060875	30.2490	9.7082	1.09290	2874.6	657555
916	839056	768575296	30.2655	9.7118	1.09170	2877.7	658993
917	840889	771095213	30.2820	9.7153	1.09051	2880.8	660433
918	842724	773620632	30.2985	9.7188	1.08932	2884.0	661874
919	844561	776151559	30.3150	9.7224	1.08814	2887.1	663317
920	846400	778688000	30.3315	9.7259	1.08696	2890.3	664761
921	848241	781229961	30.3480	9.7294	1.08578	2893.4	666207
922	850084	783777448	30.3645	9.7329	1.08460	2896.5	667654
923	851929	786330467	30.3809	9.7364	1.08342	2899.7	669103
924	853776	788889024	30.3974	9.7400	1.08225	2902.8	670554
925	855625	791453125	30.4138	9.7435	1.08108	2906.0	672006
926	857476	794022776	30.4302	9.7470	1.07991	2909.1	673460
927	859329	796597983	30.4467	9.7505	1.07875	2912.3	674915
928	861184	799178752	30.4631	9.7540	1.07759	2915.4	676372
929	863041	801765089	30.4795	9.7575	1.07643	2918.5	677831
930	864900	804357000	30.4959	9.7610	1.07527	2921.7	679291
931	866761	806954491	30.5123	9.7645	1.07411	2924.8	680752
932	868624	809557568	30.5287	9.7680	1.07296	2928.0	682216
933	870489	812166237	30.5450	9.7715	1.07181	2931.1	683680
934	872356	814780504	30.5614	9.7750	1.07066	2934.2	685147
935	874225	817400375	30.5778	9.7785	1.06952	2937.4	686615
936	876096	820025856	30.5941	9.7819	1.06838	2940.5	688084
937	877969	822656953	30.6105	9.7854	1.06724	2943.7	689555
938	879844	825293672	30.6268	9.7889	1.06610	2946.8	691028
939	881721	827936019	30.6431	9.7924	1.06496	2950.0	692502
940	883600	830584000	30.6594	9.7959	1.06383	2953.1	693978
941	885481	833237621	30.6757	9.7993	1.06270	2956.2	695455
942	887364	835896888	30.6920	9.8028	1.06157	2959.4	696934
943	889249	838561807	30.7083	9.8063	1.06045	2962.5	698415
944	891136	841232384	30.7246	9.8097	1.05932	2965.7	699897
945	893025	843908625	30.7409	9.8132	1.05820	2968.8	701380
946	894916	846590536	30.7571	9.8167	1.05708	2971.9	702865
947	896809	849278123	30.7734	9.8201	1.05597	2975.1	704352
948	898704	851971392	30.7896	9.8236	1.05485	2978.2	705840
949	900601	854670349	30.8058	9.8270	1.05374	2981.4	707330

FUNCTIONS OF NUMBERS, 950 to 999

No.	Square	Cube	Square Root	Cubic Root	1000 x Reciprocal	No. = Diameter	
						Circum.	Area
950	902500	857375000	30.8221	9.8305	1.05263	2984.5	708822
951	904401	860085351	30.8383	9.8339	1.05152	2987.7	710315
952	906304	862801408	30.8545	9.8374	1.05042	2990.8	711809
953	908209	865523177	30.8707	9.8408	1.04932	2993.9	713306
954	910116	868250664	30.8869	9.8443	1.04822	2997.1	714803
955	912025	870983875	30.9031	9.8477	1.04712	3000.2	716303
956	913936	873722816	30.9192	9.8511	1.04603	3003.4	717804
957	915849	876467493	30.9354	9.8546	1.04493	3006.5	719306
958	917764	879217912	30.9516	9.8580	1.04384	3009.6	720810
959	919681	881974079	30.9677	9.8614	1.04275	3012.8	722316
960	921600	884736000	30.9839	9.8648	1.04167	3015.9	723823
961	923521	887503681	31.0000	9.8683	1.04058	3019.1	725332
962	925444	890277128	31.0161	9.8717	1.03950	3022.2	726842
963	927369	893056347	31.0322	9.8751	1.03842	3025.4	728354
964	929296	895841344	31.0483	9.8785	1.03734	3028.5	729867
965	931225	898632125	31.0644	9.8819	1.03627	3031.6	731382
966	933156	901428696	31.0805	9.8854	1.03520	3034.8	732899
967	935089	904231063	31.0966	9.8888	1.03413	3037.9	734417
968	937024	907039232	31.1127	9.8922	1.03306	3041.1	735937
969	938961	909853209	31.1288	9.8956	1.03199	3044.2	737458
970	940900	912673000	31.1448	9.8990	1.03093	3047.3	738981
971	942841	915498611	31.1609	9.9024	1.02987	3050.5	740506
972	944784	918330048	31.1769	9.9058	1.02881	3053.6	742032
973	946729	921167317	31.1929	9.9092	1.02775	3056.8	743559
974	948676	924010424	31.2090	9.9126	1.02669	3059.9	745088
975	950625	926859375	31.2250	9.9160	1.02564	3063.1	746619
976	952576	929714176	31.2410	9.9194	1.02459	3066.2	748151
977	954529	932574833	31.2570	9.9227	1.02354	3069.3	749685
978	956484	935441352	31.2730	9.9261	1.02249	3072.5	751221
979	958441	938313739	31.2890	9.9295	1.02145	3075.6	752758
980	960400	941192000	31.3050	9.9329	1.02041	3078.8	754296
981	962361	944076141	31.3209	9.9363	1.01937	3081.9	755837
982	964324	946966168	31.3369	9.9396	1.01833	3085.0	757378
983	966289	949862087	31.3528	9.9430	1.01729	3088.2	758922
984	968256	952763904	31.3688	9.9464	1.01626	3091.3	760466
985	970225	955671625	31.3847	9.9497	1.01523	3094.5	762013
986	972196	958585256	31.4006	9.9531	1.01420	3097.6	763561
987	974169	961504803	31.4166	9.9565	1.01317	3100.8	765111
988	976144	964430272	31.4325	9.9598	1.01215	3103.9	766662
989	978121	967361669	31.4484	9.9632	1.01112	3107.0	768214
990	980100	970299000	31.4643	9.9666	1.01010	3110.2	769769
991	982081	973242271	31.4802	9.9699	1.00908	3113.3	771325
992	984064	976191488	31.4960	9.9733	1.00806	3116.5	772882
993	986049	979146657	31.5119	9.9766	1.00705	3119.6	774441
994	988036	982107784	31.5278	9.9800	1.00604	3122.7	776002
995	990025	985074875	31.5436	9.9833	1.00503	3125.9	777564
996	992016	988047936	31.5595	9.9866	1.00402	3129.0	779128
997	994009	991026973	31.5753	9.9900	1.00301	3132.2	780693
998	996004	994011992	31.5911	9.9933	1.00200	3135.3	782260
999	998001	997002999	31.6070	9.9967	1.00100	3138.5	783828

Courtesy of Carnegie-Illinois Steel Corporation

COMMON LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7

COMMON LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7664	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4

NATURAL SINES

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
0°	0000	0017	0035	0052	0070	0087	0105	0122	0140	0157	3	6	9	12	15
1	0175	0192	0209	0227	0244	0262	0279	0297	0314	0332	3	6	9	12	15
2	0349	0366	0384	0401	0419	0436	0454	0471	0488	0506	3	6	9	12	15
3	0523	0541	0558	0576	0593	0610	0628	0645	0663	0680	3	6	9	12	15
4	0698	0715	0732	0750	0767	0785	0802	0819	0837	0854	3	6	9	12	15
5	0872	0889	0906	0924	0941	0958	0976	0993	1011	1028	3	6	9	12	14
6	1045	1063	1080	1097	1115	1132	1149	1167	1184	1201	3	6	9	12	14
7	1219	1236	1253	1271	1288	1305	1323	1340	1357	1374	3	6	9	12	14
8	1392	1409	1426	1444	1461	1478	1495	1513	1530	1547	3	6	9	12	14
9	1564	1582	1599	1616	1633	1650	1668	1685	1702	1719	3	6	9	12	14
10	1736	1754	1771	1788	1805	1822	1840	1857	1874	1891	3	6	9	12	14
11	1908	1925	1942	1959	1977	1994	2011	2028	2045	2062	3	6	9	11	14
12	2079	2096	2113	2130	2147	2164	2181	2198	2215	2232	3	6	9	11	14
13	2250	2267	2284	2300	2317	2334	2351	2368	2385	2402	3	6	8	11	14
14	2419	2436	2453	2470	2487	2504	2521	2538	2554	2571	3	6	8	11	14
15	2588	2605	2622	2639	2656	2672	2689	2706	2723	2740	3	6	8	11	14
16	2756	2773	2790	2807	2823	2840	2857	2874	2890	2907	3	6	8	11	14
17	2924	2940	2957	2974	2990	3007	3024	3040	3057	3074	3	6	8	11	14
18	3090	3107	3123	3140	3156	3173	3190	3206	3223	3239	3	6	8	11	14
19	3256	3272	3289	3305	3322	3338	3355	3371	3387	3404	3	5	8	11	14
20	3420	3437	3453	3469	3486	3502	3518	3535	3551	3567	3	5	8	11	14
21	3584	3600	3616	3633	3649	3665	3681	3697	3714	3730	3	5	8	11	14
22	3746	3762	3778	3795	3811	3827	3843	3859	3875	3891	3	5	8	11	14
23	3907	3923	3939	3955	3971	3987	4003	4019	4035	4051	3	5	8	11	14
24	4067	4083	4099	4115	4131	4147	4163	4179	4195	4210	3	5	8	11	13
25	4226	4242	4258	4274	4289	4305	4321	4337	4352	4368	3	5	8	11	13
26	4384	4399	4415	4431	4446	4462	4478	4493	4509	4524	3	5	8	10	13
27	4540	4555	4571	4586	4602	4617	4633	4648	4664	4679	3	5	8	10	13
28	4695	4710	4726	4741	4756	4772	4787	4802	4818	4833	3	5	8	10	13
29	4848	4863	4879	4894	4909	4924	4939	4955	4970	4985	3	5	8	10	13
30	5000	5015	5030	5045	5060	5075	5090	5105	5120	5135	3	5	8	10	13
31	5150	5165	5180	5195	5210	5225	5240	5255	5270	5284	2	5	7	10	12
32	5299	5314	5329	5344	5358	5373	5388	5402	5417	5432	2	5	7	10	12
33	5446	5461	5476	5490	5505	5519	5534	5548	5563	5577	2	5	7	10	12
34	5592	5606	5621	5635	5650	5664	5678	5693	5707	5721	2	5	7	10	12
35	5736	5750	5764	5779	5793	5807	5821	5835	5850	5864	2	5	7	10	12
36	5878	5892	5906	5920	5934	5948	5962	5976	5990	6004	2	5	7	9	12
37	6018	6032	6046	6060	6074	6088	6101	6115	6129	6143	2	5	7	9	12
38	6157	6170	6184	6198	6211	6225	6239	6252	6266	6280	2	5	7	9	11
39	6293	6307	6320	6334	6347	6361	6374	6388	6401	6414	2	4	7	9	11
40	6428	6441	6455	6468	6481	6494	6508	6521	6534	6547	2	4	7	9	11
41	6561	6574	6587	6600	6613	6626	6639	6652	6665	6678	2	4	7	9	11
42	6691	6704	6717	6730	6743	6756	6769	6782	6794	6807	2	4	6	9	11
43	6820	6833	6845	6858	6871	6884	6896	6909	6921	6934	2	4	6	8	11
44	6947	6959	6972	6984	6997	7009	7022	7034	7046	7059	2	4	6	8	10

NATURAL SINES

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
45°	7071	7083	7096	7108	7120	7133	7145	7157	7169	7181	2	4	6	8	10
46	7193	7206	7218	7230	7242	7254	7266	7278	7290	7302	2	4	6	8	10
47	7314	7325	7337	7349	7361	7373	7385	7396	7408	7420	2	4	6	8	10
48	7431	7443	7455	7466	7478	7490	7501	7513	7524	7536	2	4	6	8	10
49	7547	7558	7570	7581	7593	7604	7615	7627	7638	7649	2	4	6	8	9
50	7660	7672	7683	7694	7705	7716	7727	7738	7749	7760	2	4	6	7	9
51	7771	7782	7793	7804	7815	7826	7837	7848	7859	7869	2	4	5	7	9
52	7880	7891	7902	7912	7923	7934	7944	7955	7965	7976	2	4	5	7	9
53	7986	7997	8007	8018	8028	8039	8049	8059	8070	8080	2	3	5	7	9
54	8090	8100	8111	8121	8131	8141	8151	8161	8171	8181	2	3	5	7	8
55	8192	8202	8211	8221	8231	8241	8251	8261	8271	8281	2	3	5	7	8
56	8290	8300	8310	8320	8329	8339	8348	8358	8368	8377	2	3	5	6	8
57	8387	8396	8406	8415	8425	8434	8443	8453	8462	8471	2	3	5	6	8
58	8480	8490	8499	8508	8517	8526	8536	8545	8554	8563	2	3	5	6	8
59	8572	8581	8590	8599	8607	8616	8625	8634	8643	8652	1	3	4	6	7
60	8660	8669	8678	8686	8695	8704	8712	8721	8729	8738	1	3	4	6	7
61	8746	8755	8763	8771	8780	8788	8796	8805	8813	8821	1	3	4	6	7
62	8829	8838	8846	8854	8862	8870	8878	8886	8894	8902	1	3	4	5	7
63	8910	8918	8926	8934	8942	8949	8957	8965	8973	8980	1	3	4	5	6
64	8988	8996	9003	9011	9018	9026	9033	9041	9048	9056	1	3	4	5	6
65	9063	9070	9078	9085	9092	9100	9107	9114	9121	9128	1	2	4	5	6
66	9135	9143	9150	9157	9164	9171	9178	9184	9191	9198	1	2	3	5	6
67	9205	9212	9219	9225	9232	9239	9245	9252	9259	9265	1	2	3	4	6
68	9272	9278	9285	9291	9298	9304	9311	9317	9323	9330	1	2	3	4	5
69	9336	9342	9348	9354	9361	9367	9373	9379	9385	9391	1	2	3	4	5
70	9397	9403	9409	9415	9421	9426	9432	9438	9444	9449	1	2	3	4	5
71	9455	9461	9466	9472	9478	9483	9489	9494	9500	9505	1	2	3	4	5
72	9511	9516	9521	9527	9532	9537	9542	9548	9553	9558	1	2	3	4	4
73	9563	9568	9573	9578	9583	9588	9593	9598	9603	9608	1	2	2	3	4
74	9613	9617	9622	9627	9632	9636	9641	9646	9650	9655	1	2	2	3	4
75	9659	9664	9668	9673	9677	9681	9686	9690	9694	9699	1	1	2	3	4
76	9703	9707	9711	9715	9720	9724	9728	9732	9736	9740	1	1	2	3	3
77	9744	9748	9751	9755	9759	9763	9767	9770	9774	9778	1	1	2	3	3
78	9781	9785	9789	9792	9796	9799	9803	9806	9810	9813	1	1	2	2	3
79	9816	9820	9823	9826	9829	9833	9836	9839	9842	9845	1	1	2	2	3
80	9848	9851	9854	9857	9860	9863	9866	9869	9871	9874	0	1	1	2	2
81	9877	9880	9882	9885	9888	9890	9893	9895	9898	9900	0	1	1	2	2
82	9903	9905	9907	9910	9912	9914	9917	9919	9921	9923	0	1	1	2	2
83	9925	9928	9930	9932	9934	9936	9938	9940	9942	9943	0	1	1	1	2
84	9945	9947	9949	9951	9952	9954	9956	9957	9959	9960	0	1	1	1	1
85	9962	9963	9965	9966	9968	9969	9971	9972	9973	9974	0	0	1	1	1
86	9976	9977	9978	9979	9980	9981	9982	9983	9984	9985	0	0	1	1	1
87	9986	9987	9988	9989	9990	9990	9991	9992	9993	9993	0	0	0	1	1
88	9994	9995	9995	9996	9996	9997	9997	9997	9998	9998	0	0	0	0	0
89	9998	9999	9999	9999	9999	1.000 nearly	1.000 nearly	1.000 nearly	1.000 nearly	1.000 nearly	0	0	0	0	0

NATURAL COSINES

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
0°	1.000	1.000 nearly	1.000 nearly	1.000 nearly	1.000 nearly	9999	9999	9999	9999	9999	0	0	0	0	0
1	9998	9998	9998	9997	9997	9997	9996	9996	9995	9995	0	0	0	0	0
2	9994	9993	9993	9992	9991	9990	9990	9989	9988	9987	0	0	0	1	1
3	9986	9985	9984	9983	9982	9981	9980	9979	9978	9977	0	0	1	1	1
4	9976	9974	9973	9972	9971	9969	9968	9966	9965	9963	0	0	1	1	1
5	9962	9960	9959	9957	9956	9954	9952	9951	9949	9947	0	1	1	1	2
6	9945	9943	9942	9940	9938	9936	9934	9932	9930	9928	0	1	1	1	2
7	9925	9923	9921	9919	9917	9914	9912	9910	9907	9905	0	1	1	2	2
8	9903	9900	9898	9895	9893	9890	9888	9885	9882	9880	0	1	1	2	2
9	9877	9874	9871	9869	9866	9863	9860	9857	9854	9851	0	1	1	2	2
10	9848	9845	9842	9839	9836	9833	9829	9826	9823	9820	1	1	2	2	3
11	9816	9813	9810	9806	9803	9799	9796	9792	9789	9785	1	1	2	2	3
12	9781	9778	9774	9770	9767	9763	9759	9755	9751	9748	1	1	2	3	3
13	9744	9740	9736	9732	9728	9724	9720	9715	9711	9707	1	1	2	3	3
14	9703	9699	9694	9690	9686	9681	9677	9673	9668	9664	1	1	2	3	4
15	9659	9655	9650	9646	9641	9636	9632	9627	9622	9617	1	2	2	3	4
16	9613	9608	9603	9598	9593	9588	9583	9578	9573	9568	1	2	2	3	4
17	9563	9558	9553	9548	9542	9537	9532	9527	9521	9516	1	2	3	4	4
18	9511	9505	9500	9494	9489	9483	9478	9472	9466	9461	1	2	3	4	5
19	9455	9449	9444	9438	9432	9426	9421	9415	9409	9403	1	2	3	4	5
20	9397	9391	9385	9379	9373	9367	9361	9354	9348	9342	1	2	3	4	5
21	9336	9330	9323	9317	9311	9304	9298	9291	9285	9278	1	2	3	4	5
22	9272	9265	9259	9252	9245	9239	9232	9225	9219	9212	1	2	3	4	6
23	9205	9198	9191	9184	9178	9171	9164	9157	9150	9143	1	2	3	5	6
24	9135	9128	9121	9114	9107	9100	9092	9085	9078	9070	1	2	4	5	6
25	9063	9056	9048	9041	9033	9026	9018	9011	9003	8996	1	3	4	5	6
26	8988	8980	8973	8965	8957	8949	8942	8934	8926	8918	1	3	4	5	6
27	8910	8902	8894	8886	8878	8870	8862	8854	8846	8838	1	3	4	5	7
28	8829	8821	8813	8805	8796	8788	8780	8771	8763	8755	1	3	4	6	7
29	8746	8738	8729	8721	8712	8704	8695	8686	8678	8669	1	3	4	6	7
30	8660	8652	8643	8634	8625	8616	8607	8599	8590	8581	1	3	4	6	7
31	8572	8563	8554	8545	8536	8526	8517	8508	8499	8490	2	3	5	6	8
32	8480	8471	8462	8453	8443	8434	8425	8415	8406	8396	2	3	5	6	8
33	8387	8377	8368	8358	8348	8339	8329	8320	8310	8300	2	3	5	6	8
34	8290	8281	8271	8261	8251	8241	8231	8221	8211	8202	2	3	5	7	8
35	8192	8181	8171	8161	8151	8141	8131	8121	8111	8100	2	3	5	7	8
36	8090	8080	8070	8059	8049	8039	8028	8018	8007	7997	2	3	5	7	9
37	7986	7976	7965	7955	7944	7934	7923	7912	7902	7891	2	4	5	7	9
38	7880	7869	7859	7848	7837	7826	7815	7804	7793	7782	2	4	5	7	9
39	7771	7760	7749	7738	7727	7716	7705	7694	7683	7672	2	4	6	7	9
40	7660	7649	7638	7627	7615	7604	7593	7581	7570	7559	2	4	6	8	9
41	7547	7536	7524	7513	7501	7490	7478	7466	7455	7443	2	4	6	8	10
42	7431	7420	7408	7396	7385	7373	7361	7349	7337	7325	2	4	6	8	10
43	7314	7302	7290	7278	7266	7254	7242	7230	7218	7206	2	4	6	8	10
44	7193	7181	7169	7157	7145	7133	7120	7108	7096	7083	2	4	6	8	10

N.B.—Numbers in difference columns to be subtracted, not added.

NATURAL COSINES

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
45°	7071	7059	7046	7034	7022	7009	6997	6984	6972	6959	2	4	6	8	10
46	6947	6934	6921	6909	6896	6884	6871	6858	6845	6833	2	4	6	8	11
47	6820	6807	6794	6782	6769	6756	6743	6730	6717	6704	2	4	6	9	11
48	6691	6678	6665	6652	6639	6626	6613	6600	6587	6574	2	4	7	9	11
49	6561	6547	6534	6521	6508	6494	6481	6468	6455	6441	2	4	7	9	11
50	6428	6414	6401	6388	6374	6361	6347	6334	6320	6307	2	4	7	9	11
51	6293	6280	6266	6252	6239	6225	6211	6198	6184	6170	2	5	7	9	11
52	6157	6143	6129	6115	6101	6088	6074	6060	6046	6032	2	5	7	9	12
53	6018	6004	5990	5976	5962	5948	5934	5920	5906	5892	2	5	7	9	12
54	5878	5864	5850	5835	5821	5807	5793	5779	5764	5750	2	5	7	9	12
55	5736	5721	5707	5693	5678	5664	5650	5635	5621	5606	2	5	7	10	12
56	5592	5577	5563	5548	5534	5519	5505	5490	5476	5461	2	5	7	10	12
57	5446	5432	5417	5402	5388	5373	5358	5344	5329	5314	2	5	7	10	12
58	5299	5284	5270	5255	5240	5225	5210	5195	5180	5165	2	5	7	10	12
59	5150	5135	5120	5105	5090	5075	5060	5045	5030	5015	3	5	8	10	13
60	5000	4985	4970	4955	4939	4924	4909	4894	4879	4863	3	5	8	10	13
61	4848	4833	4818	4802	4787	4772	4756	4741	4726	4710	3	5	8	10	13
62	4695	4679	4664	4648	4633	4617	4602	4586	4571	4555	3	5	8	10	13
63	4540	4524	4509	4493	4478	4462	4446	4431	4415	4399	3	5	8	10	13
64	4384	4368	4352	4337	4321	4305	4289	4274	4258	4242	3	5	8	11	13
65	4226	4210	4195	4179	4163	4147	4131	4115	4099	4083	3	5	8	11	13
66	4067	4051	4035	4019	4003	3987	3971	3955	3939	3923	3	5	8	11	14
67	3907	3891	3875	3859	3843	3827	3811	3795	3778	3762	3	5	8	11	14
68	3746	3730	3714	3697	3681	3665	3649	3633	3616	3600	3	5	8	11	14
69	3584	3567	3551	3535	3518	3502	3486	3469	3453	3437	3	5	8	11	14
70	3420	3404	3387	3371	3355	3338	3322	3305	3289	3272	3	5	8	11	14
71	3256	3239	3223	3206	3190	3173	3156	3140	3123	3107	3	6	8	11	14
72	3090	3074	3057	3040	3024	3007	2990	2974	2957	2940	3	6	8	1	14
73	2924	2907	2890	2874	2857	2840	2823	2807	2790	2773	3	6	8	11	14
74	2756	2740	2723	2706	2689	2672	2656	2639	2622	2605	3	6	8	11	14
75	2588	2571	2554	2538	2521	2504	2487	2470	2453	2436	3	6	8	11	14
76	2419	2402	2385	2368	2351	2334	2317	2300	2284	2267	3	6	8	11	14
77	2250	2233	2215	2198	2181	2164	2147	2130	2113	2096	3	6	9	11	14
78	2079	2062	2045	2028	2011	1994	1977	1959	1942	1925	3	6	9	11	14
79	1908	1891	1874	1857	1840	1822	1805	1788	1771	1754	3	6	9	12	14
80	1736	1719	1702	1685	1668	1650	1633	1616	1599	1582	3	6	9	12	14
81	1564	1547	1530	1513	1495	1478	1461	1444	1426	1409	3	6	9	12	14
82	1392	1374	1357	1340	1323	1305	1288	1271	1253	1236	3	6	9	12	14
83	1219	1201	1184	1167	1149	1132	1115	1097	1080	1063	3	6	9	12	14
84	1045	1028	1011	0993	0976	0958	0941	0924	0906	0889	3	6	9	12	14
85	0872	0854	0837	0819	0802	0785	0767	0750	0732	0715	3	6	9	12	15
86	0698	0680	0663	0645	0628	0610	0593	0576	0558	0541	3	6	9	12	15
87	0523	0506	0488	0471	0454	0436	0419	0401	0384	0366	3	6	9	12	15
88	0349	0332	0314	0297	0279	0262	0244	0227	0209	0192	3	6	9	12	15
89	0175	0157	0140	0122	0105	0087	0070	0052	0035	0017	3	6	9	12	15

N.B.—Numbers in difference columns to be subtracted, not added.

NATURAL TANGENTS

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
0°	.0000	0017	0035	0052	0070	0087	0105	0122	0140	0157	3	6	9	12	14
1	.0175	0192	0209	0227	0244	0262	0279	0297	0314	0332	3	6	9	12	15
2	.0349	0367	0384	0402	0419	0437	0454	0472	0489	0507	3	6	9	12	15
3	.0524	0542	0559	0577	0594	0612	0629	0647	0664	0682	3	6	9	12	15
4	.0699	0717	0734	0752	0769	0787	0805	0822	0840	0857	3	6	9	12	15
5	.0875	0892	0910	0928	0945	0963	0981	0998	1016	1033	3	6	9	12	15
6	.1051	1069	1086	1104	1122	1139	1157	1175	1192	1210	3	6	9	12	15
7	.1228	1246	1263	1281	1299	1317	1334	1352	1370	1388	3	6	9	12	15
8	.1405	1423	1441	1459	1477	1495	1512	1530	1548	1566	3	6	9	12	15
9	.1584	1602	1620	1638	1655	1673	1691	1709	1727	1745	3	6	9	12	15
10	.1763	1781	1799	1817	1835	1853	1871	1890	1908	1926	3	6	9	12	15
11	.1944	1962	1980	1998	2016	2035	2053	2071	2089	2107	3	6	9	12	15
12	.2126	2144	2162	2180	2199	2217	2235	2254	2272	2290	3	6	9	12	15
13	.2309	2327	2345	2364	2382	2401	2419	2438	2456	2475	3	6	9	12	15
14	.2493	2512	2530	2549	2568	2586	2605	2623	2642	2661	3	6	9	12	16
15	.2679	2698	2717	2736	2754	2773	2792	2811	2830	2849	3	6	9	13	16
16	.2867	2886	2905	2924	2943	2962	2981	3000	3019	3038	3	6	9	13	16
17	.3057	3076	3096	3115	3134	3153	3172	3191	3211	3230	3	6	10	13	16
18	.3249	3269	3288	3307	3327	3346	3365	3385	3404	3424	3	6	10	13	16
19	.3443	3463	3482	3502	3522	3541	3561	3581	3600	3620	3	6	10	13	17
20	.3640	3659	3679	3699	3719	3739	3759	3779	3799	3819	3	7	10	13	17
21	.3839	3859	3879	3899	3919	3939	3959	3979	4000	4020	3	7	10	13	17
22	.4040	4061	4081	4101	4122	4142	4163	4183	4204	4224	3	7	10	14	17
23	.4245	4265	4286	4307	4327	4348	4369	4390	4411	4431	3	7	10	14	17
24	.4452	4473	4494	4515	4536	4557	4578	4599	4621	4642	4	7	10	14	18
25	.4663	4684	4706	4727	4748	4770	4791	4813	4834	4856	4	7	11	14	18
26	.4877	4899	4921	4942	4964	4986	5008	5029	5051	5073	4	7	11	15	18
27	.5095	5117	5139	5161	5184	5206	5228	5250	5272	5295	4	7	11	15	18
28	.5317	5340	5362	5384	5407	5430	5452	5475	5498	5520	4	8	11	15	19
29	.5543	5566	5589	5612	5635	5658	5681	5704	5727	5750	4	8	12	15	19
30	.5774	5797	5820	5844	5867	5890	5914	5938	5961	5985	4	8	12	16	20
31	.6009	6032	6056	6080	6104	6128	6152	6176	6200	6224	4	8	12	16	20
32	.6249	6273	6297	6322	6346	6371	6395	6420	6445	6469	4	8	12	16	20
33	.6494	6519	6544	6569	6594	6619	6644	6669	6694	6720	4	8	13	17	21
34	.6745	6771	6796	6822	6847	6873	6899	6924	6950	6976	4	9	13	17	21
35	.7002	7028	7054	7080	7107	7133	7159	7186	7212	7239	4	9	13	18	22
36	.7265	7292	7319	7346	7373	7400	7427	7454	7481	7508	5	9	14	18	23
37	.7536	7563	7590	7618	7646	7673	7701	7729	7757	7785	5	9	14	18	23
38	.7813	7841	7869	7898	7926	7954	7983	8012	8040	8069	5	10	14	19	24
39	.8098	8127	8156	8185	8214	8243	8273	8302	8332	8361	5	10	15	20	24
40	.8391	8421	8451	8481	8511	8541	8571	8601	8632	8662	5	10	15	20	25
41	.8693	8724	8754	8785	8816	8847	8878	8910	8941	8972	5	10	16	21	26
42	.9004	9036	9067	9099	9131	9163	9195	9228	9260	9293	5	11	16	21	27
43	.9325	9358	9391	9424	9457	9490	9523	9556	9590	9623	6	11	17	22	28
44	.9657	9691	9725	9759	9793	9827	9861	9896	9930	9965	6	11	17	23	29

NATURAL TANGENTS

	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
45°	1.0000	0035	0070	0105	0141	0176	0212	0247	0283	0319	6	12	18	24	30
46	1.0355	0392	0428	0464	0501	0538	0575	0612	0649	0686	6	12	18	25	31
47	1.0724	0761	0799	0837	0875	0913	0951	0990	1028	1067	6	13	19	25	32
48	1.1106	1145	1184	1224	1263	1303	1343	1383	1423	1463	7	13	20	26	33
49	1.1504	1544	1585	1626	1667	1708	1750	1792	1833	1875	7	14	21	28	34
50	1.1918	1960	2002	2045	2088	2131	2174	2218	2261	2305	7	14	22	29	36
51	1.2349	2393	2437	2482	2527	2572	2617	2662	2708	2753	8	15	23	30	38
52	1.2799	2846	2892	2938	2985	3032	3079	3127	3175	3222	8	16	23	31	39
53	1.3270	3319	3367	3416	3465	3514	3564	3613	3663	3713	8	16	25	33	41
54	1.3764	3814	3865	3916	3968	4019	4071	4124	4176	4229	9	17	26	34	43
55	1.4281	4335	4388	4442	4496	4550	4605	4659	4715	4770	9	18	27	36	45
56	1.4826	4882	4938	4994	5051	5108	5166	5224	5282	5340	10	19	29	38	48
57	1.5399	5458	5517	5577	5637	5697	5757	5818	5880	5941	10	20	30	40	50
58	1.6003	6066	6128	6191	6255	6319	6383	6447	6512	6577	11	21	32	43	53
59	1.6643	6709	6775	6842	6909	6977	7045	7113	7182	7251	11	23	34	45	56
60	1.7321	7391	7461	7532	7603	7675	7747	7820	7893	7966	12	24	36	48	60
61	1.8040	8115	8190	8265	8341	8418	8495	8572	8650	8728	13	26	38	51	64
62	1.8807	8887	8967	9047	9128	9210	9292	9375	9458	9542	14	27	41	55	68
63	1.9626	9711	9797	9883	9970	$\overline{0}057$	$\overline{0}145$	$\overline{0}233$	$\overline{0}323$	$\overline{0}413$	15	29	44	58	73
64	2.0503	0594	0686	0778	0872	0965	1060	1155	1251	1348	16	31	47	63	78
65	2.1445	1543	1642	1742	1842	1943	2045	2148	2251	2355	17	34	51	68	85
66	2.2460	2566	2673	2781	2889	2998	3109	3220	3332	3445	18	37	55	74	92
67	2.3559	3673	3789	3906	4023	4142	4262	4383	4504	4627	20	40	60	79	99
68	2.4751	4876	5002	5129	5257	5386	5517	5649	5782	5916	22	43	65	87	108
69	2.6051	6187	6325	6464	6605	6746	6889	7034	7179	7326	24	47	71	95	118
70	2.7475	7625	7776	7929	8083	8239	8397	8556	8716	8878	26	52	78	104	130
71	2.9042	9208	9375	9544	9714	9887	$\overline{0}061$	$\overline{0}237$	$\overline{0}415$	$\overline{0}595$	29	58	87	115	144
72	3.0777	0961	1146	1334	1524	1716	1910	2106	2305	2506	32	64	96	129	161
73	3.2709	2914	3122	3332	3544	3759	3977	4197	4420	4646	36	72	108	144	180
74	3.4874	5105	5339	5576	5816	6059	6305	6554	6806	7062	41	82	122	162	203
75	3.7321	7583	7848	8118	8391	8667	8947	9232	9520	9812	46	94	139	186	232
76	4.0108	0408	0713	1022	1335	1653	1976	2303	2635	2972	53	107	160	214	267
77	4.3315	3662	4015	4374	4737	5107	5483	5864	6252	6646	62	124	186	248	310
78	4.7046	7453	7867	8288	8716	9152	9594	$\overline{0}045$	$\overline{0}504$	$\overline{0}970$	73	146	219	292	365
79	5.1446	1929	2422	2924	3435	3955	4486	5026	5578	6140	87	175	262	350	437
80	5.6713	7297	7894	8502	9124	9758	$\overline{0}405$	$\overline{1}066$	$\overline{1}742$	$\overline{2}432$					
81	6.3138	3859	4596	5350	6122	6912	7720	8548	9395	$\overline{0}264$					
82	7.1154	2066	3002	3962	4947	5958	6996	8062	9158	$\overline{0}285$					
83	8.1443	2636	3863	5126	6427	7769	9152	$\overline{0}579$	$\overline{2}052$	$\overline{3}572$					
84	9.5144	9.677	9.845	10.02	10.20	10.39	10.58	10.78	10.99	11.20					
85	11.43	11.66	11.91	12.16	12.43	12.71	13.00	13.30	13.62	13.95					
86	14.30	14.67	15.06	15.46	15.89	16.35	16.83	17.34	17.89	18.46					
87	19.08	19.74	20.45	21.20	22.02	22.90	23.86	24.90	26.03	27.27					
88	28.64	30.14	31.82	33.69	35.80	38.19	40.92	44.07	47.74	52.08					
89	57.29	63.66	71.62	81.85	95.49	114.6	143.2	191.0	286.5	573.0					

Difference columns cease to be useful, owing to the rapidity with which the value of the tangent changes.

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE		STRANDED WIRE	
Diameter		Cross Section								Weight			
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B.&S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Wire Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.	Pounds per 1,000 Ft.	Kilograms per Km.
1,414.0	35.92	1,571,000	2,000,000	1,013.4	....	....	....	....	....	....	....	6,175	9,190
1,405.0	35.68	1,550,000	1,974,000	1,000.0	....	....	....	....	....	....	....	6,093	9,068
1,323.0	33.60	1,374,000	1,750,000	886.7	....	....	....	....	....	....	....	5,403	8,041
1,257.0	31.92	1,240,000	1,579,000	800.0	....	....	....	....	....	....	....	4,875	7,254
1,225.0	31.11	1,178,000	1,500,000	760.1	....	....	....	....	....	....	....	4,631	6,892
1,118.0	28.40	981,700	1,250,000	633.4	....	....	....	....	....	....	....	3,859	5,743
1,111.0	28.21	968,800	1,233,000	625.0	....	....	....	....	....	....	....	3,808	5,667
1,000.0	25.40	785,400	1,000,000	506.7	....	....	....	....	....	....	....	3,088	4,595
993.4	25.23	775,000	986,800	500.0	....	....	....	....	....	....	....	3,047	4,534
948.7	24.10	706,900	900,000	456.0	....	....	....	....	....	....	....	2,779	4,136
894.4	22.72	628,300	800,000	405.4	....	....	....	....	....	....	....	2,470	3,676
888.5	22.57	620,000	789,400	400.0	....	....	....	....	....	....	....	2,437	3,627
866.0	22.00	589,000	750,000	380.0	....	....	....	....	....	....	....	2,316	3,446
836.7	21.25	549,800	700,000	354.7	....	....	....	....	....	....	....	2,161	3,216
774.6	19.67	471,200	600,000	304.0	....	....	....	....	....	....	....	1,853	2,757
769.5	19.54	465,000	592,100	300.0	....	....	....	....	....	....	....	1,828	2,720
707.1	17.96	392,700	500,000	253.4	....	....	....	....	....	....	....	1,544	2,298
688.2	17.48	372,000	473,600	240.0	....	....	....	....	....	....	....	1,462	2,176
632.5	16.06	314,200	400,000	202.7	....	....	....	....	....	....	....	1,235	1,838
604.2	15.35	286,800	365,100	185.0	....	....	....	....	....	....	....	1,127	1,678
591.6	15.03	274,900	350,000	177.3	....	....	....	....	....	....	....	1,081	1,608
547.7	13.91	235,600	300,000	152.0	....	....	....	....	....	....	....	926	1,378
544.1	13.82	232,500	296,000	150.0	....	....	....	....	....	....	....	914	1,360

1,000,000 square mils = 1 square inch. E.g., cross sectional area of No. 4/0 B. & S. is 0.1662 square inch.

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE		STRANDED WIRE	
DIAMETER		CROSS SECTION								WEIGHT			
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B.&S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Wire Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.	Pounds per 1,000 Ft.	Kilograms per Km.
500.0	12.70	196,300	250,000	126.7	....	....	....	....	7/0	757	1,126	772	1,149
490.0	12.45	188,600	240,100	121.7	....	7/0	....	....	....	727	1,082	742	1,104
486.6	12.36	186,000	236,800	120.0	....	....	....	....	....	717	1,067	731	1,088
464.0	11.79	169,100	215,300	109.1	....	....	....	....	6/0	652	971	666	990
461.5	11.72	167,300	213,000	107.9	....	6/0	....	....	....	646	959	659	978
460.0	11.68	166,200	211,600	107.2	4/0	....	....	....	....	641	953	653	972
454.0	11.53	161,900	206,100	104.4	....	....	4/0	4/0	....	624	929	636	948
433.0	11.00	147,300	187,500	95.0	....	....	....	....	....	568	845	579	861
432.0	10.97	146,600	186,600	94.56	....	....	....	....	5/0	565	840	576	857
430.5	10.93	145,600	185,300	93.91	....	5/0	....	....	....	562	835	573	852
425.0	10.80	141,900	180,600	91.52	....	....	3/0	3/0	....	547	813	558	829
409.6	10.40	131,800	167,800	85.03	3/0	....	....	....	....	508	756	518	771
400.0	10.16	125,700	160,000	81.07	....	....	....	....	4/0	484	720	494	734
393.8	10.00	121,800	155,100	78.58	....	4/0	....	....	....	469	698	478	712
380.0	9.652	113,400	144,400	73.17	....	....	2/0	2/0	....	429	650	438	653
372.0	9.449	108,700	138,400	70.12	....	....	....	....	3/0	419	623	427	635
371.7	9.441	108,500	138,100	70.0	....	....	....	....	....	418	622	427	635
364.8	9.266	104,500	133,100	67.43	2/0	....	....	....	....	403	599	411	611
362.5	9.208	103,200	131,400	66.58	....	3/0	....	....	....	398	592	406	604
348.0	8.839	95,110	121,100	61.36	....	....	....	....	2/0	367	545	374	556
340.0	8.636	90,790	115,600	58.58	....	....	1/0	1/0	....	350	521	357	531
331.0	8.407	86,050	109,600	55.52	....	2/0	....	....	....	332	494	339	504
324.9	8.251	82,890	105,500	53.48	1/0	....	....	....	....	319	475	326	485

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE		STRANDED WIRE	
DIAMETER		CROSS SECTION								WEIGHT			
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B.&S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Wire Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.	Pounds per 1,000 Ft.	Kilograms per Km.
324.0	8.230	82,450	105,000	53.19	....	....	....	....	1/0	318	472	324	481
314.1	7.979	77,500	98,680	50.0	....	....	....	....	....	299	445	305	453
306.5	7.785	73,780	93,940	47.60	....	1/0	....	....	....	284	423	290	431
300.0	7.620	70,690	90,000	45.60	....	....	1	1	1	272	405	278	413
289.3	7.348	65,730	83,690	42.41	1	....	....	....	....	253	377	258	385
284.0	7.214	63,350	80,660	40.87	....	....	2	2	....	244	363	249	370
283.0	7.188	62,900	80,090	40.58	....	1	....	....	....	242	361	247	368
276.0	7.010	59,830	76,180	38.60	....	....	....	....	2	231	343	236	350
262.8	6.676	54,250	69,070	35.0	....	....	....	....	....	209	311	213	317
262.5	6.668	54,120	68,910	34.92	....	2	....	....	....	209	310	213	316
259.0	6.579	52,690	67,080	33.99	....	....	3	3	....	203	302	207	308
257.6	6.544	52,130	66,370	33.63	2	....	....	....	....	201	299	205	305
252.0	6.401	49,880	63,500	32.18	....	....	....	....	3	192	286	197	292
243.7	6.190	46,640	59,390	30.09	....	3	....	....	....	180	267	184	272
238.0	6.045	44,490	56,640	28.70	....	....	4	4	....	173	255	176	260
232.0	5.893	42,270	53,820	27.27	....	....	....	....	4	163	242	166	247
229.4	5.827	41,340	52,630	26.67	3	....	....	....	....	159	237	163	242
225.3	5.723	39,870	50,760	25.72	....	4	....	....	....	154	228	157	233
222.1	5.642	38,750	49,340	25.0	....	....	....	....	....	149	222	152	227
220.0	5.588	38,010	48,400	24.52	....	....	5	5	....	147	217	150	221
212.0	5.385	35,300	44,940	22.77	....	....	....	....	5	136	202	139	206
207.0	5.258	33,650	42,850	21.71	....	5	....	....	....	130	193	133	197
204.3	5.189	32,780	41,740	21.15	4	....	....	....	....	126	188	129	192

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE		STRANDED WIRE	
DIAMETER		CROSS SECTION								WEIGHT			
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B.&S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Wire Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.	Pounds per 1,000 Ft.	Kilograms per Km.
203.0	5.156	32,370	41,210	20.88	....	....	6	6	....	125.0	186.0	128.0	190.0
192.0	4.877	28,950	36,860	18.68	....	6	....	....	6	112.0	166.0	114.0	169.0
181.9	4.621	26,000	33,100	16.77	5	....	....	....	....	100.2	149.0	102.0	152.0
180.0	4.572	25,450	32,400	16.42	....	....	7	7	....	98.1	146.0	100.0	149.0
177.7	4.514	24,800	31,580	16.0	....	....	....	....	....	95.6	142.0	97.5	145.0
177.0	4.496	24,610	31,330	15.87	....	7	....	....	....	94.8	141.0	96.7	144.0
176.0	4.470	24,330	30,980	15.70	....	....	....	....	7	93.8	140.0	95.6	142.0
165.0	4.191	21,380	27,220	13.80	....	....	8	8	....	82.4	123.0	84.1	125.0
162.0	4.115	20,620	26,250	13.30	6	8	....	....	....	79.5	118.0	81.1	121.0
160.0	4.064	20,110	25,600	12.97	....	....	....	....	8	77.5	115.0	79.1	117.0
148.3	3.767	17,270	21,990	11.14	....	9	....	....	....	66.6	99.0	67.9	101.0
148.0	3.759	17,200	21,900	11.10	....	....	9	9	....	66.3	98.6	67.6	100.6
144.3	3.665	16,350	20,820	10.55	7	....	....	....	....	63.0	93.8	64.3	95.7
144.0	3.658	16,290	20,740	10.51	....	....	....	....	9	62.8	93.4	64.1	95.3
140.5	3.568	15,500	19,740	10.0	....	....	....	....	....	59.7	88.9	60.9	90.7
135.0	3.429	14,310	18,230	9.235	....	10	....	....	....	55.2	82.0	56.3	83.6
134.0	3.404	14,100	17,960	9.098	....	....	10	10	....	54.4	80.9	55.4	82.5
128.5	3.264	12,970	16,510	8.366	8	....	....	....	....	50.0	74.4	51.0	75.9
128.0	3.251	12,870	16,380	8.302	....	....	....	....	10	49.6	73.8	50.6	75.3
120.5	3.061	11,400	14,520	7.358	....	11	....	....	....	44.0	65.4	44.8	66.7
120.0	3.048	11,310	14,400	7.297	....	....	11	11	....	43.6	64.8	44.5	66.1
116.0	2.946	10,570	13,460	6.818	....	....	....	....	11	40.7	60.6	41.5	61.8
114.4	2.906	10,280	13,090	6.634	9	....	....	....	....	39.6	59.0	40.4	60.1

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE		STRANDED WIRE	
DIAMETER		CROSS SECTION								WEIGHT			
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B.&S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Wire Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.	Pounds per 1,000 Ft.	Kilograms per Km.
109.0	2.769	9,331	11,880	6.020	....	....	12	12	....	36.0	53.5	36.7	54.6
108.8	2.764	9,300	11,840	6.0	....	....	....	....	....	35.8	53.3	36.6	54.4
105.5	2.680	8,742	11,130	5.640	....	12	....	....	....	33.7	50.2	34.4	51.2
104.0	2.642	8,495	10,820	5.481	....	....	....	....	12	32.7	48.7	33.4	49.7
101.9	2.588	8,155	10,380	5.261	10	....	....	....	....	31.4	46.8	32.1	47.7
95.0	2.413	7,088	9,025	4.573	....	....	13	13	....	27.3	40.6	27.8	41.4
92.0	2.337	6,648	8,464	4.289	....	....	....	....	13	25.6	38.1	26.1	38.9
91.5	2.324	6,576	8,372	4.242	....	13	....	....	....	25.3	37.7	25.8	38.5
90.74	2.305	6,467	8,234	4.172	11	....	....	....	....	24.9	37.1	25.4	37.8
88.85	2.257	6,200	7,894	4.0	....	....	....	....	....	23.9	35.6	24.4	36.3
83.0	2.108	5,411	6,889	3.491	....	....	14	14	....	20.9	31.0	21.3	31.7
80.81	2.053	5,129	6,530	3.309	12	....	....	....	....	19.8	29.4	20.2	30.0
80.0	2.032	5,027	6,400	3.243	....	14	....	....	14	19.4	28.8	19.8	29.4
72.0	1.829	4,072	5,184	2.627	....	15	15	15	15	15.7	23.4	16.0	23.9
71.96	1.828	4,067	5,178	2.624	13	....	....	....	....	15.7	23.3	16.0	23.8
70.24	1.784	3,875	4,934	2.5	....	....	....	....	....	14.9	22.2	15.2	22.7
65.0	1.651	3,318	4,225	2.141	....	....	16	16	....	12.8	19.0	13.1	19.4
64.08	1.628	3,225	4,107	2.081	14	....	....	....	....	12.4	18.5	12.7	18.9
64.0	1.626	3,217	4,096	2.075	....	....	....	....	16	12.4	18.5	12.6	18.8
62.5	1.588	3,068	3,906	1.979	....	16	....	....	....	11.8	17.6	12.0	18.0
58.0	1.473	2,642	3,364	1.705	....	....	17	17	....	10.2	15.1	10.4	15.4
57.07	1.450	2,558	3,257	1.650	15	....	....	....	....	9.86	14.7	10.1	15.0
56.0	1.422	2,463	3,136	1.589	....	....	....	....	17	9.49	14.1	9.68	14.4

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

Solid Wire: Diameter, Mils	Solid Wire: Diameter, Millimeters	Solid Wire: Cross Section, Square Mils	Solid Wire: Cross Section, Circular Mils	Solid Wire: Cross Section, Square Millimeters	Gauge Numbers: American Wire Gauge (B.&S.)	Gauge Numbers: Steel Wire Gauge (Washburn & Moen)	Gauge Numbers: Birmingham Wire Gauge (Stubs)	Gauge Numbers: Old English Wire Gauge (London)	Gauge Numbers: British Standard Wire Gauge	Weight, Solid Wire: Pounds per 1,000 Ft.	Weight, Solid Wire: Kilograms per Km.	Weight, Stranded Wire: Pounds per 1,000 Ft.	Weight, Stranded Wire: Kilograms per Km.
55.12	1.400	2,386.0	3,038.0	1.539	....	....	....	....	....	9.20	13.7	9.38	14.0
54.41	1.382	2,325.0	2,960.0	1.5	....	....	....	....	....	8.96	13.3	9.14	13.6
54.0	1.372	2,290.0	2,916.0	1.478	....	17	....	....	....	8.83	13.1	9.01	13.4
50.82	1.291	2,028.0	2,583.0	1.309	16	....	....	....	....	7.82	11.6	7.98	11.8
49.0	1.245	1,886.0	2,401.0	1.217	....	....	18	18	....	7.27	10.8	7.42	11.0
48.0	1.219	1,810.0	2,304.0	1.167	....	....	....	....	18	6.97	10.4	7.11	10.6
47.5	1.207	1,772.0	2,256.0	1.143	....	18	....	....	....	6.83	10.2	6.97	10.4
47.24	1.200	1,753.0	2,232.0	1.131	....	....	....	....	....	6.76	10.0	6.90	10.2
45.26	1.150	1,609.0	2,048.0	1.038	17	....	....	....	....	6.20	9.23	6.32	9.41
42.0	1.067	1,385.0	1,764.0	0.8938	....	....	19	....	....	5.34	7.94	5.45	8.10
41.0	1.041	1,320.0	1,681.0	.8518	....	19	....	....	....	5.09	7.57	5.19	7.72
40.30	1.024	1,276.0	1,624.0	.8231	18	....	....	....	....	4.92	7.32	5.02	7.47
40.0	1.016	1,257.0	1,600.0	.8107	....	....	....	19	19	4.84	7.21	4.94	7.35
39.37	1.000	1,217.0	1,550.0	.7854	....	....	....	....	....	4.70	6.98	4.79	7.12
36.0	0.9144	1,018.0	1,296.0	.6567	....	....	....	....	20	3.92	5.84	4.00	5.95
35.89	.9116	1,012.0	1,288.0	.6527	19	....	....	....	....	3.90	5.80	3.98	5.92
35.43	.9000	986.1	1,255.0	.6362	....	....	....	....	....	3.80	5.66	3.88	5.77
35.0	.8890	962.1	1,225.0	.6207	....	....	20	20	....	3.71	5.52	3.78	5.63
34.8	.8839	951.1	1,211.0	.6136	....	20	....	....	....	3.67	5.46	3.74	5.57
32.0	.8128	804.2	1,024.0	.5189	....	....	21	....	21	3.10	4.61	3.16	4.70
31.96	.8118	802.3	1,022.0	.5176	20	....	....	....	....	3.09	4.60	3.15	4.69
31.7	.8052	789.2	1,005.0	.5092	....	21	....	....	....	3.04	4.53	3.10	4.62
31.5	.8001	779.3	992.3	.5028	....	....	....	21	....	3.00	4.47	3.06	4.56

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

Solid Wire: Diameter, Mils	Solid Wire: Diameter, Millimeters	Solid Wire: Cross Section, Square Mils	Solid Wire: Cross Section, Circular Mils	Solid Wire: Cross Section, Square Millimeters	Gauge Numbers: American Wire Gauge (B. & S.)	Gauge Numbers: Steel Wire Gauge (Washburn & Moen)	Gauge Numbers: Birmingham Wire Gauge (Stubs)	Gauge Numbers: Old English Gauge (London)	Gauge Numbers: British Standard Wire Gauge	Solid Wire: Weight, Pounds per 1,000 Ft.	Solid Wire: Weight, Kilograms per Km.
29.5	.7493	683.5	870.3	.4410	.....	.....	.....	22	.....	2.63	3.91
28.6	.7264	642.4	818.0	.4145	.....	22	.....	.....	.....	2.48	3.68
28.46	.7229	636.3	810.1	.4105	21	.....	.....	.....	.....	2.45	3.65
28.0	.7112	615.8	784.0	.3973	.....	.....	22	.....	22	2.37	3.53
27.0	.6858	572.6	729.0	.3694	.....	.....	.....	23	.....	2.21	3.28
25.8	.6553	522.8	665.6	.3373	.....	23	.....	.....	.....	2.01	3.00
25.35	.6438	504.6	642.4	.3255	22	.....	.....	.....	.....	1.94	2.89
25.0	.6350	490.9	625.0	.3167	.....	.....	23	24	.....	1.89	2.82
24.0	.6096	452.4	576.0	.2919	.....	.....	.....	.....	23	1.74	2.59
23.62	.6000	438.3	558.0	.2827	.....	.....	.....	.....	.....	1.69	2.52
23.0	.5842	415.5	529.0	.2680	.....	24	.....	25	.....	1.60	2.38
22.57	.5733	400.1	509.5	.2582	23	.....	.....	.....	.....	1.54	2.30
22.0	.5588	380.1	484.0	.2452	.....	.....	24	.....	24	1.47	2.18
20.5	.5207	330.1	420.3	.2129	.....	.....	.....	26	.....	1.27	1.89
20.4	.5182	326.9	416.2	.2109	.....	25	.....	.....	.....	1.26	1.88
20.10	.5106	317.3	404.0	.2047	24	.....	.....	.....	.....	1.22	1.82
20.0	.5080	314.2	400.0	.2027	.....	.....	25	.....	25	1.21	1.80
18.75	.4763	276.1	351.6	.1781	.....	.....	.....	27	.....	1.06	1.58
18.1	.4597	257.3	327.6	.1660	.....	26	.....	.....	.....	0.992	1.48
18.0	.4572	254.5	324.0	.1642	.....	.....	26	.....	26	.981	1.46
17.90	.4547	251.7	320.4	.1624	25	.....	.....	.....	.....	.970	1.44
17.3	.4394	235.1	299.3	.1517	.....	27	.....	.....	.....	.906	1.35
16.50	.4191	213.8	272.3	.1380	.....	.....	.....	28	.....	.824	1.23
16.4	.4166	211.2	269.0	.1363	.....	.....	.....	.....	27	.814	1.21
16.2	.4115	206.1	262.4	.1330	.....	28	.....	.....	.....	.794	1.18

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE	
Diameter		Cross Section								Weight	
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B. & S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.
16.0	.4064	201.1	256.0	.1297	.....	.....	27	.....	.....	.775	1.15
15.94	.4049	199.6	254.1	.1288	26	.....	.....	.....	.....	.769	1.14
15.75	.4000	194.8	248.0	.1257	.....	.....	.....	.....	.....	.751	1.12
15.50	.3937	188.7	240.3	.1217	.....	.....	.....	29	.....	.727	1.08
15.0	.3810	176.7	225.0	.1140	.....	29	.....	.....	.....	.681	1.01
14.8	.3759	172.0	219.0	.1110	.....	.....	.....	.....	28	.663	0.987
14.20	.3606	158.3	201.5	.1021	27	.....	.....	.....	.....	.610	.908
14.0	.3556	153.9	196.0	.09932	.....	30	28	.....	.....	.593	.883
13.75	.3493	148.5	189.1	.09580	.....	.....	.....	30	.....	.572	.852
13.6	.3454	145.3	185.0	.09372	.....	.....	.....	.....	29	.560	.833
13.2	.3353	136.8	174.2	.08829	.....	31	.....	.....	.....	.527	.785
13.0	.3302	132.7	169.0	.08563	.....	.....	29	.....	.....	.512	.762
12.8	.3251	128.7	163.8	.08302	.....	32	.....	.....	.....	.496	.738
12.64	.3211	125.5	159.8	.08098	28	.....	.....	.....	.....	.484	.720
12.4	.3150	120.8	153.8	.07791	.....	.....	.....	.....	30	.465	.693
12.25	.3112	117.9	150.1	.07604	.....	.....	.....	31	.....	.454	.676
12.0	.3048	113.1	144.0	.07297	.....	.....	30	.....	.....	.436	.649
11.8	.2997	109.4	139.2	.07055	.....	33	.....	.....	.....	.421	.627
11.6	.2946	105.7	134.6	.06818	.....	.....	.....	.....	31	.407	.606
11.26	.2859	99.54	126.7	.06422	29	.....	.....	.....	.....	.384	.571
11.25	.2858	99.40	126.6	.06413	.....	.....	.....	32	.....	.383	.570
10.8	.2743	91.61	116.6	.05910	.....	.....	.....	.....	32	.353	.525
10.4	.2642	84.95	108.2	.05481	.....	34	.....	.....	.....	.327	.488
10.25	.2604	82.52	105.1	.05324	.....	.....	.....	33	.....	.318	.473
10.03	.2546	78.94	100.5	.05093	30	.....	.....	.....	.....	.304	.453
10.0	.2540	78.54	100.0	.05067	.....	.....	31	.....	33	.303	.451

COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

SOLID WIRE					GAUGE NUMBERS					SOLID WIRE	
DIAMETER		CROSS SECTION								WEIGHT	
Mils	Millimeters	Square Mils	Circular Mils	Square Millimeters	American Wire Gauge (B. & S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Gauge (London)	British Standard Wire Gauge	Pounds per 1,000 Ft.	Kilograms per Km.
9.50	.2413	70.88	90.25	.04573	.....	35	.....	34	.....	.273	.407
9.2	.2337	66.48	84.64	.04289	.....	.....	.....	.....	34	.256	.382
9.00	.2286	63.62	81.00	.04104	.....	36	32	35	.....	.245	.365
8.928	.2268	62.60	79.70	.04039	31	.....	.....	.....	.....	.241	.359
8.5	.2159	56.75	72.25	.03661	.....	37	.....	.....	.....	.219	.325
8.4	.2134	55.42	70.56	.03575	.....	.....	.....	.....	35	.214	.318
8.0	.2032	50.27	64.00	.03243	.....	38	33	.....	.....	.194	.288
7.950	.2019	49.64	63.21	.03203	32	.....	.....	.....	.....	.191	.285
7.6	.1930	45.36	57.76	.02927	.....	.....	.....	.....	36	.175	.260
7.50	.1905	44.18	56.25	.02850	.....	39	.....	36	.....	.170	.253
7.080	.1798	39.37	50.13	.02540	33	.....	.....	.....	.....	.152	.226
7.0	.1778	38.48	49.00	.02483	.....	40	34	.....	.....	.148	.221
6.8	.1727	36.32	46.24	.02343	.....	.....	.....	.....	37	.140	.208
6.6	.1676	34.21	43.56	.02207	.....	41	.....	.....	.....	.132	.196
6.50	.1651	33.18	42.25	.02141	.....	.....	.....	37	.....	.128	.190
6.305	.1601	31.22	39.75	.02014	34	.....	.....	.....	.....	.120	.179
6.2	.1575	30.19	38.44	.01948	.....	42	.....	.....	.....	.116	.173
6.0	.1524	28.27	36.00	.01824	.....	43	.....	.....	38	.109	.162
5.8	.1473	26.42	33.64	.01705	.....	44	.....	.....	.....	.102	.152
5.75	.1461	25.97	33.06	.01675	.....	.....	.....	38	.....	.100	.149
5.615	.1426	24.76	31.52	.01597	35	.....	.....	.....	.....	.0954	.142
5.5	.1397	23.76	30.25	.01533	.....	45	.....	.....	.....	.0916	.136
5.2	.1321	21.24	27.04	.01370	.....	46	.....	.....	39	.0818	.122
5.000	.1270	19.63	25.00	.01267	36	47	35	39	.....	.0757	.113
4.8	.1219	18.10	23.04	.01167	.....	48	.....	.....	40	.0697	.104

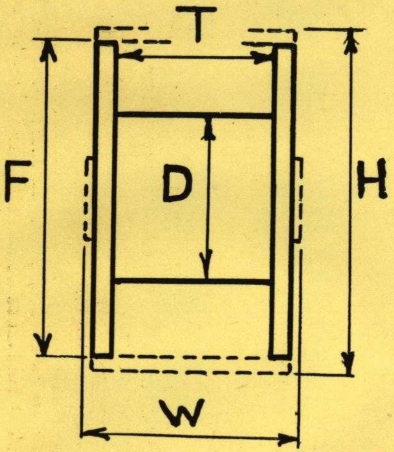
COMBINED TABLE OF THE PRINCIPAL WIRE GAUGES—(Continued)

Solid Wire: Diameter, Mils	Diameter, Millimeters	Cross Section, Square Mils	Cross Section, Circular Mils	Cross Section, Square Millimeters	Gauge Numbers: American Wire Gauge (B. & S.)	Steel Wire Gauge (Washburn & Moen)	Birmingham Wire Gauge (Stubs)	Old English Gauge (London)	British Standard Wire Gauge	Solid Wire: Weight, Pounds per 1,000 Ft.	Weight, Kilograms per Km.
4.6	.1168	16.62	21.16	.01072	.....	49	.....	.....	.....	.0641	.0953
4.50	.1143	15.90	20.25	.01026	.....	.....	.....	40	.....	.0613	.0912
4.453	.1131	15.57	19.83	.01005	37	.....	.....	.....	.....	.0600	.0893
4.4	.1118	15.21	19.36	.009810	.....	50	.....	.....	41	.0586	.0872
4.0	.1016	12.57	16.00	.008107	.....	.....	36	.....	42	.0484	.0721
3.965	.1007	12.35	15.72	.007967	38	.....	.....	.....	.....	.0476	.0708
3.6	.09144	10.18	12.96	.006567	.....	.....	.....	.....	43	.0392	.0584
3.531	.08969	9.793	12.47	.006318	39	.....	.....	.....	.....	.0377	.0562
3.2	.08128	8.042	10.24	.005189	.....	.....	.....	.....	44	.0310	.0461
3.145	.07987	7.766	9.888	.005010	40	.....	.....	.....	.....	.0299	.0445
2.800	.07113	6.159	7.842	.003973	41	.....	.....	.....	.....	.0237	.0354
2.8	.07112	6.158	7.840	.003973	.....	.....	.....	.....	45	.0237	.0353
2.494	.06334	4.884	6.219	.003151	42	.....	.....	.....	.....	.0188	.0280
2.4	.06096	4.524	5.760	.002919	.....	.....	.....	.....	46	.0174	.0259
2.221	.05641	3.873	4.932	.002499	43	.....	.....	.....	.....	.0149	.0222
2.0	.05080	3.142	4.000	.002027	.....	.....	.....	.....	47	.0121	.0180
1.978	.05023	3.072	3.911	.001982	44	.....	.....	.....	.....	.0118	.0176
1.761	.04473	2.436	3.102	.001572	45	.....	.....	.....	.....	.0094	.0140
1.6	.04064	2.011	2.560	.001297	.....	.....	.....	.....	48	.0077	.0115
1.568	.03984	1.932	2.460	.001246	46	.....	.....	.....	.....	.0074	.0111
1.397	.03547	1.532	1.951	.0009884	47	.....	.....	.....	.....	.0059	.0088
1.244	.03159	1.215	1.547	.0007838	48	.....	.....	.....	.....	.0047	.0070
1.2	.03048	1.131	1.440	.0007297	.....	.....	.....	.....	49	.0044	.0065
1.108	.02813	0.9635	1.227	.0006216	49	.....	.....	.....	.....	.0037	.0055
1.0	.02540	.7854	1.000	.0005067	.....	.....	.....	.....	50	.0030	.0045
0.9863	.02505	.7641	0.9728	.0004929	50	.....	.....	.....	.....	.0029	.0044

DECIMAL EQUIVALENTS

8ths	16ths	32nds	64ths	Decimal	8ths	16ths	32nds	64ths	Decimal
..	..	..	1	.015625	..	..	..	33	.515625
..	..	1	2	.03125	..	..	17	34	.53125
..	..	..	3	.046875	..	..	..	35	.546875
..	1	2	4	.0625	..	9	18	36	.5625
..	..	..	5	.078125	..	..	..	37	.578125
..	..	3	6	.09375	..	..	19	38	.59375
..	..	..	7	.109375	..	..	..	39	.609375
1	2	4	8	.125	5	10	20	40	.625
..	..	..	9	.140625	..	..	..	41	.640625
..	..	5	10	.15625	..	..	21	42	.65625
..	..	..	11	.171875	..	..	..	43	.671875
..	3	6	12	.1875	..	11	22	44	.6875
..	..	..	13	.203125	..	..	..	45	.703125
..	..	7	14	.21875	..	..	23	46	.71875
..	..	..	15	.234375	..	..	..	47	.734375
2	4	8	16	.25	6	12	24	48	.75
..	..	..	17	.265625	..	..	..	49	.765625
..	..	9	18	.28125	..	..	25	50	.78125
..	..	..	19	.296875	..	..	..	51	.796875
..	5	10	20	.3125	..	13	26	52	.8125
..	..	..	21	.328125	..	..	..	53	.828125
..	..	11	22	.34375	..	..	27	54	.84375
..	..	..	23	.359375	..	..	..	55	.859375
3	6	12	24	.375	7	14	28	56	.875
..	..	..	25	.390625	..	..	..	57	.890625
..	..	13	26	.40625	..	..	29	58	.90625
..	..	..	27	.421875	..	..	..	59	.921875
..	7	14	28	.4375	..	15	30	60	.9375
..	..	..	29	.453125	..	..	..	61	.953125
..	..	15	30	.46875	..	..	31	62	.96875
..	..	..	31	.484375	..	..	..	63	.984375
4	8	16	32	.5	8	16	32	64	1.0

POWER CABLE REELS



Dimensions—Capacity—Weight

Dimensions: Reel F	T	D	Overall H	W	Reel Wght. (Approx.) Lbs.	Overall Diameter of Cable — Inches: ½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3
						Length of Cable on Reel (Max.) — Feet										
22	8	12	23	13½	30	355	140	....	....	....	....	....	....	....	....	....
28	14	14	29	19½	56	1,340	510	320	....	....	....	....	....	....	....	....
40	21	24	42	28½	180	3,500	1,700	1,080	595	500	....	....	....	....	....	....
44	21	24	46	28½	220	3,500	2,265	1,340	755	545	370	....	....	....	....	....
48	21	36	50	28½	260	3,400	1,415	840	470	270	....	....	....	....	....	....
56	32	36	60	39½	400	....	....	2,860	1,660	1,150	785	690	450	380	....	....
60	32	32	64	39½	450	....	....	....	2,480	1,845	1,175	1,040	750	....	....	....
66	36	40	70	46	600	....	....	....	2,890	2,150	1,520	1,135	800	695	480	....
72	36	40	76	46	760	....	....	....	....	2,600	2,150	1,685	1,275	920	850	....
78	36	44	82	46	1,020	....	....	....	....	....	2,350	1,840	1,390	1,200	930	850
84	36	44	88	47	1,360	....	....	....	....	....	2,775	2,200	1,700	1,265	975	890
90	51	38	94	62	1,950	....	....	....	....	....	....	....	....	2,770	2,200	....
100	50	44	104	64	2,180	....	....	....	....	....	....	....	....	....	2,810	2,200

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